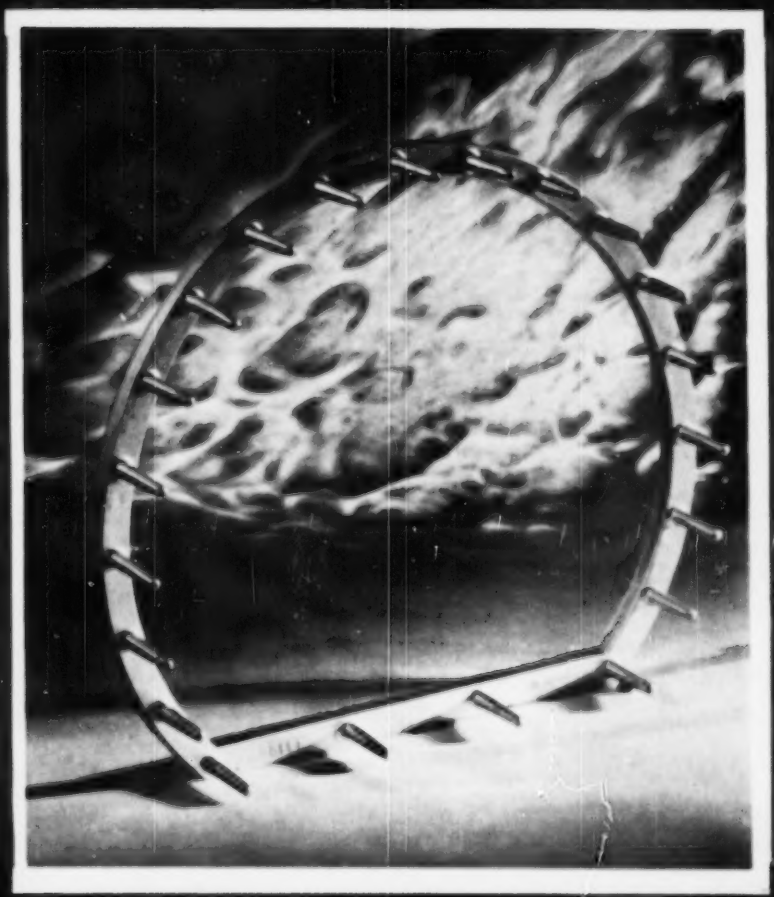
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION



THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

MONARCH ALUMINUM MFG. COMPANY

CLEVELAND 2, OHIO

Memo: TO BUYERS OF CASTINGS, WHO WANT

DEPENDABLE CASTINGS... RELIABLE SERVICE COMPETITIVE PRICES

These facts about MONARCH should help you solve your casting problems:

- **Financial Responsibility** — Monarch enjoys the highest rating granted by Dun & Bradstreet, Inc.
- 35 years of harmonious labor relations under present management . . . 1000 skilled technicians and employees to serve you.
- 200,000 square feet of Monarch-owned manufacturing area, with the most modern foundry labor-saving equipment.
- 2 completely staffed Engineering Departments coordinated to assure sound, economical Permanent Mold or Die Cast design.
- A complete Physical and Metallurgical laboratory to assure quality of products and aid development.
- A Quality Control Department — trained in finished product standards — to work closely with your Engineers and Inspectors.
- Sales Engineering Personnel who offer intelligent service throughout the duration of your contracts.
- "Best location in the Nation" with direct facilities for rail, air or truck shipments.

ALUMINUM PERMANENT MOLD CASTINGS

ALUMINUM DIE CASTINGS

ZINC ALLOY DIE CASTINGS

Monarch Firsts:

- Since 1925, one of the pioneers in the development of Permanent Mold Castings.
- One of the three original companies manufacturing cast aluminum cooking utensils.
- Today the largest producer of cast aluminum cooking utensils.

Monarch's 3-1 facilities can supply the answer to your casting problems!

President and founder

If You Are *Designing* a New Product Or *Re-styling* an Old One . . .

Schultz Engineers Would Like to Point Out The Advantages of DIE CASTING!

Manufacturers interested in knowing more about die casting and the dies and tools employed are invited to consult us before a design has progressed to a point where it cannot be altered readily.

Often slight changes in the design of a part will make it unusually suitable for production by the economical die casting process, without sacrificing the essential requirements of the part.

As a leading supplier of highest quality zinc alloy die castings, we have a wealth of experience which is available to designers without obligation.

If your production will benefit by die casting we will point out the advantages. By the same token, if die casting appears impracticable we will tell you so frankly.

SCHULTZ DIE CASTING COMPANY
1810 CLINTON STREET • TOLEDO 7, OHIO

JANUARY 1950
Vol. 8 No. 1

DIE CASTINGS

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Tucker 6703

COVER—Originally produced from formed wire, welded at 23 separate spots, this rack for a portable dishwasher has been redesigned as an aluminum die casting and can be used almost as it comes from the die. Article on page 36.

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Acceptance under Section 34.64 P. L. & R. authorized.

here's how

MAGNESIUM DIE CASTINGS

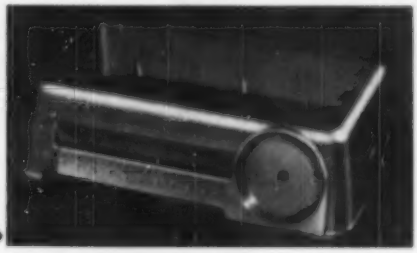
solve many problems.

A Proved Material Competitively Priced

Magnesium has definite inherent advantages over other common die casting alloys, and—best of all—you don't have to pay a premium price to get them! In most cases *Dow magnesium die castings are competitive with other die castings* and in some cases they are cheaper.

Long past the experimental stage, magnesium has been tested and approved in a wide range of applications requiring an economically sound die casting material.

thin section over large projected area?



Dow can do it in Magnesium!

Wall thickness on the kitchen scale housing shown above ranges from .080" at the ends to .100" at the back, exemplifying the thin sections that can be die cast in magnesium. The over-all size of the housing is 12⅞" x 7⅝" x 3¼" yet the finished casting weighs just 12 oz.

You'll get many other advantages when you use magnesium die castings. Magnesium die casting alloys don't "creep" or "grow"—better tolerances are obtainable. Magnesium does not solder to the die—less draft required. Accurately located small diameter cored holes *with no taper* are possible in magnesium. When machining is required, you can do it faster with magnesium—it's the easiest of all die casting alloys to machine.

Use these inherent advantages to solve your die casting problems. Consult with Dow on design. They are experts in solving difficult die casting problems. Use Dow's high production die casting facilities to assure quality magnesium die castings at prices competitive with other alloys.

Write to Dept. MG-1

Magnesium Division

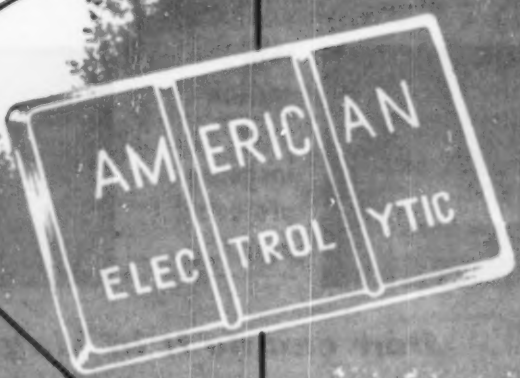
THE DOW CHEMICAL COMPANY

MIDLAND, MICHIGAN

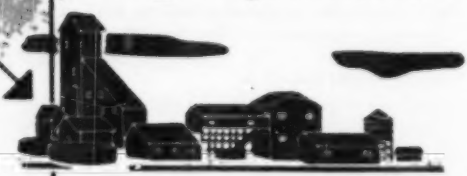
New York • Boston • Philadelphia • Washington • Atlanta
Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

American Electrolytic

99.99+% slab zinc



a reliable source for die casting requirements



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for AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO
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Aluminum and Zinc Base

DIE CASTINGS *by* PARAGON

AMERICAN DIE CASTING INSTITUTE
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MEMBER

OVER 80,000 SQUARE FEET OF MODERN PLANT

Here at PARAGON we have every facility, together with the man power, experience and engineering knowledge to handle your requirements in aluminum and zinc base die castings to your fullest satisfaction. *Inquiries are invited.*

PARAGON

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QUALITY
PARAGON CAST
DIE CASTINGS

Aluminum die-cast end-plate for Wagner "Victoria" Sweeper has all holes, slots and lugs cast into position. Note chrome-plated outside contour.

Wagner "Victoria" with top of case removed.

ALUMINUM DIE CASTING
Replaces Wood End-Plate

in the WAGNER "Victoria" . . .
"All-Metal" Komb-Kleaned Sweeper!

When the manufacturers of this popular sweeper decided to bring out a De Luxe Model in a metal case, they investigated the possibility of replacing the conventional wood end-plate with a die casting. The primary objectives were *greater rigidity* and *better appearance.*

They learned, to their surprise, that the aluminum die cast plate pictured above would cost only a cent or two more than the wood part — BUT that they could save these few cents, and more, in lower assembly costs.

This part is furnished with all lugs, slots and holes — for fastening and mounting various parts — cast into position, accurately and permanently! Die cast of light, strong aluminum alloy, these end pieces also permit greater freedom in designing for better appearance, and result in tighter, more dust-proof construction of the all-metal case.

Consider Die Castings by MILWAUKEE when you have the problem of designing a new model of your product — or re-designing an old one.

MILWAUKEE DIE CASTING COMPANY
1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

LETTERS TO THE Editor

SMALL PLATED CASTINGS

I am in the process of taking some bids on a number of castings weighing from 2½ to 4 ounces. These die castings I would like to purchase completely finished, that is, brass plated, silver plated and chrome plated.

Would you be good enough to let me know whether or not you have a listing of die casters with facilities for carrying on such plating operations also.—S. F.

Information forwarded.—Ed.

HUBBING DIE CAVITIES

The practice of hubbing die blanks involves special design and consideration of the materials used. We were much interested therefore in the excellent article in the July, 1948, number on this subject.

We can find no information on this subject in textbooks and we are writing to ask if any of your readers can put us in touch with information from such sources.—G.G.M.C.

We suggest that you obtain copies of the following two articles: "The Procedure of Die Hobbing," by Islyn Thomas and John Hohl, available from the Newark Die Company, 22 Scott St., Newark, N. J., and "Hobbing Mold Cavities in Alloy Steels," by John Serowski, which appeared in the October, 1949, issue of Machinery magazine.

Perhaps some of our readers can suggest additional sources of information.—Ed.

PAINT SPRAY MASKS

In your article, "Close Fitting Paint Spray Masks by Electroforming," page 48 of the March issue, mention is made of the fact that the Conforming Matrix Corp., Toledo, Ohio, specializes in producing such masks for castings, stampings, plastics and other materials.

We would like more information (catalog) on masks avail-

(Continued on Page 8)

How do you know you are buying your die castings at the lowest price — unless you send us your blue prints for quotations?

PRESSURE CASTINGS, INC.

die castings

ZINC AND ALUMINUM ALLOYS

CLEVELAND 19, OHIO

GEO. H. BALLS, PRESIDENT JOS. GOODMAN JR., CHIEF ENGINEER

MEMBER, AMERICAN DIE CASTING INSTITUTE

Quality with Economy
. . . ARE YOU SATISFIED with the
• COST
• QUALITY
• APPEARANCE
of your product?
Why not drop your problem in the lap of our Engineering Department. Let us show you the way to "Quality with Economy" through Die Castings.
Advance PRESSURE CASTINGS, Inc.
N. 14th TO N. 15th STREETS AT WYTHE AVENUE • BROOKLYN 11, N. Y.

LETTERS TO THE EDITOR

(Continued from Page 6)

able and their capabilities.—R. J. S.

For further information contact Conforming Matrix Corp., 346 Factories Bldg., Toledo 2, Ohio.—Ed

ABRASIVE BLASTING

We would appreciate a reprint of your 9/49 issue, page 45, Abrasive Blasting of Clean Die Castings, by J. F. Farrell. We receive your magazine but this particular issue must have been misplaced.—J. W.

Copy forwarded.—Ed.

SMALL DIE CAST SCREW

We were very much interested in your article entitled "How Small Is a Die Casting?" which appeared on page 26, Vol. 7, No. 1 in the January 1949 issue of Die Castings.

Please advise firms who do this work.

We wish to obtain estimates for a small screw we use in our product.—D. E. T.

Information forwarded. We might also call the reader's attention to the article appearing in our December 1949 issue, "Small Fasteners," which presents some impressive facts concerning the economy of small die cast screws, rivets, wing nuts and special fasteners.—Ed.

BIBLIOGRAPHY AVAILABLE

For the benefit of our die casting foreman and our technical engineers, we are attempting to augment our library of books and other literature dealing with all phases of the die casting problem such as control of operating conditions, die design, etc. Mr. David Laine, secretary of the American Die Casting Institute, informs me that you have a complete bibliography of die casting material. I am writing, therefore, to inquire whether you would be in a position to make any suggestions or recommendations to us. —T. E. M.

We have available a complete bibliography on technical literature and books, covering the years 1910-1946.—Ed.

DIE CASTING

...IF YOU WANT TO SWING OVER TO SPEEDIER OUTPUT, LOWER UNIT COSTS

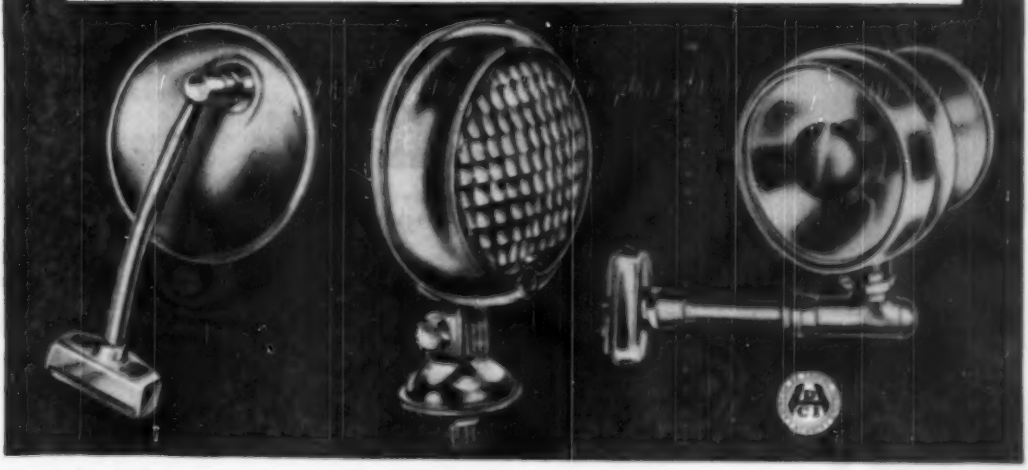
CASE HISTORIES FROM MT. VERNON FILES

. . . and effect greater savings in effort and raw materials than you've ever achieved before.

To take an example: All the housings for Yankee "Turnmaster" Automobile Directional Signals, Back-up Lights, Side-view Mirrors, and Mirror-Spotlight combinations are die cast—for however intricate their shapes, they can be accurately produced with exceptional rapidity. Apertures for Universal swivel ball joint mountings, bolt holes, decorative embossing, are all obtained in a single operation — instantly, as the die closes. And Mount Vernon produces each casting so "clean" that machining is virtually eliminated and high quality finishing simplified.

Here's economy—without sacrifice of strength or appearance. Here's the means to gain ground in today's competitive market.

Profit by considering the many advantages of die casting before scheduling your next production procedure—and consult with us. We feel confident we can show you the right direction to increased production . . . with savings "at every turn."



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Die Steels

for cold work

OHIO DIE

Air hardening high carbon—high chromium steel for high wear resistance. Free from movement in hardening.

CROCAR

Oil hardening high carbon—high chromium steel for highest wear resistance. Free from movement in hardening.

AIR HARD

5% chromium air hardening steel. Excellent combination of strength, toughness and wear resistance.

COLONIAL No. SIX

Oil hardening die steel for general purposes. Excellent machining qualities; low hardening temperature; low movement in hardening.

Manufacturers of FIRST QUALITY TOOL and DIE STEELS —exclusively

Vanadium-Alloys STEEL COMPANY

LATROBE, PENNA.

Colonial Steel Division **Anchor Drawn Steel C**

HERE'S HOW...

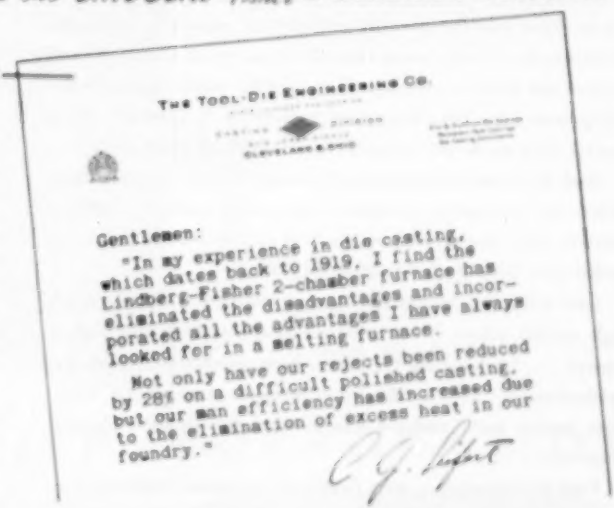
The Tool-Die Engineering Company, Cleveland, values the LINDBERG-Fisher **2-CHAMBER FURNACE**

Mr. C. G. Seifert, President, says

On a difficult polished casing of a vacuum cleaner nozzle cast in a two cavity die, Tool-Die Engineering reports that on a typical day production ran 1696 pieces of which 62 or only 3.6% were rejects. This compares with a typical day's run on the same job using a conventional furnace when production was 50% less and rejects 28% higher.

Fuel and maintenance figures to date, while not exact, show a definite savings over conventional methods. Improved working conditions result in greater efficiency per man plus increased employee morale.

Tool-Die Engineering Company is sold on the Lindberg Fisher 2-Chamber Furnace because it has proved itself in increased production — lower rejects — fuel and maintenance savings — greater man efficiency — increased employee morale.



THE TOOL-DIE ENGINEERING CO.

CLEVELAND 6, OHIO

Gentlemen:

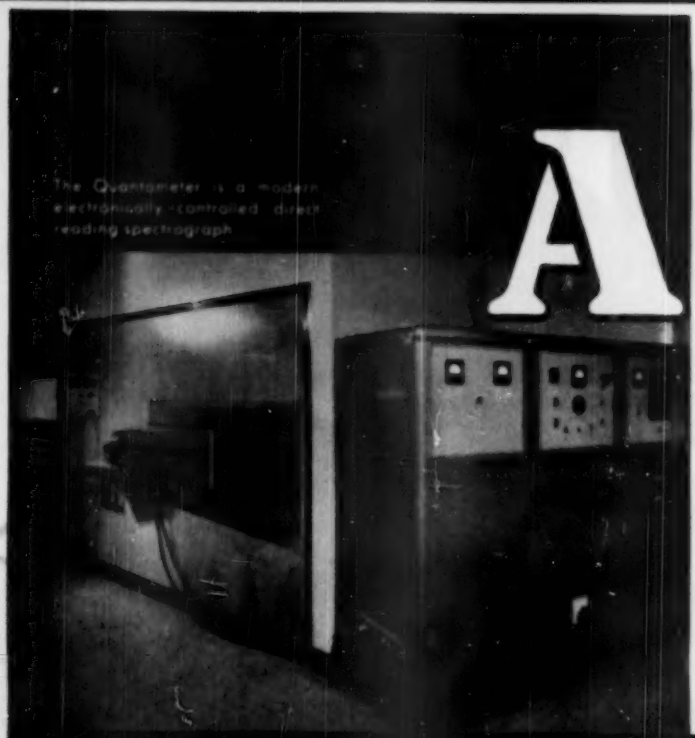
"In my experience in die casting, which dates back to 1919, I find the Lindberg-Fisher 2-chamber furnace has eliminated the disadvantages and incorporated all the advantages I have always looked for in a melting furnace.

Not only have our rejects been reduced by 28% on a difficult polished casting, but our man efficiency has increased due to the elimination of excess heat in our foundry."

C. G. Seifert

LINDBERG-Fisher MELTING FURNACES

LINDBERG ENGINEERING COMPANY • 2463 West Hubbard Street, Chicago 12, Illinois



now Apex ZINC ALLOYS

are analytically controlled with

. . . the quantometer

Again Apex sets the pace by establishing precision, analytical control in the production of zinc alloys, as well as aluminum and magnesium alloys . . . through the use of the newest quantometer equipment. Absolute, consistent uniformity is assured — from special high grade raw material to the finished ingot.

And Apex continues the pace by using the reverberatory type 60,000 lb. automatic pyrometer controlled furnace — further assuring alloy uniformity, with a final easy to handle palletized packing for fork truck handling.

Over a quarter century ago Apex set the pace . . . by producing high quality alloys (from strictly virgin metals of the highest purity) . . . by lowering the magnesium content to achieve less hotshortness . . . by establishing constant research to determine proper metal and die temperatures for ultimate physical properties.

Past performance — plus continued technical superiority — assure you that Apex will *continue* to excel in research leadership.

Large reverberatory type furnace

Palletized ingot

Apex smelting company

2537 WEST TAYLOR STREET • CHICAGO 12, ILLINOIS
6700 GRANT AVENUE • CLEVELAND 5, OHIO

*MAXIMUM PROCESS UTILIZATION

with
MADISON-KIPP
Zinc and Aluminum
DIE CASTINGS

The Model 50
Madison-Kipp Lubricator

Product engineers may find a helpful suggestion from the die casting application illustrated. The aluminum body is an important part in the MADISON-KIPP lubricator pumping unit. The lightness, accuracy and strength of the die casting and wear resistance qualities of the inserted barrel sleeves provide maximum efficiency in an instrument used universally on machine tools, work engines and compressors. Cast-in iron, steel and brass inserts are anchored for life due to the shrinkage action of the molten metal around them and they may solve some of your design problems.

Please send your inquiries to our home office in Madison, Wisconsin.

MADISON-KIPP CORPORATION

213 WAUBESA STREET, MADISON 10, WIS., U.S.A.

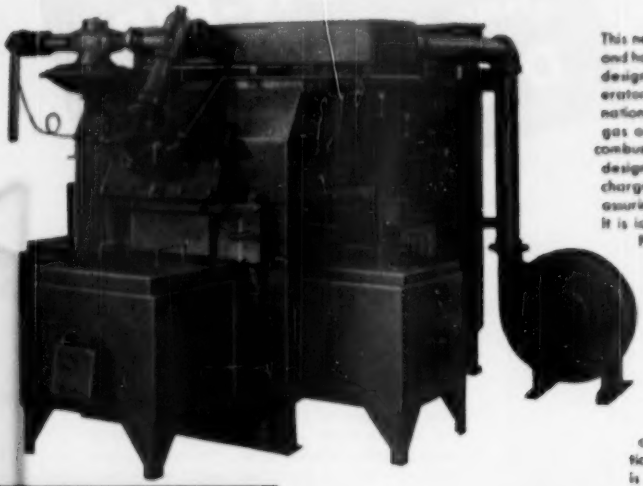
ANCIENS ATELIERS GASQUY 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

WM. COULTHARD & CO. Ltd., Carlisle, England, sole agents for England, most European countries, India, Australia, and New Zealand.

- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really* High Speed AIR TOOLS

ATTENTION ALUMINUM MELTERS !

Here's the NEW Stroman Model MC Aluminum Reverberatory Dip-Out Furnace



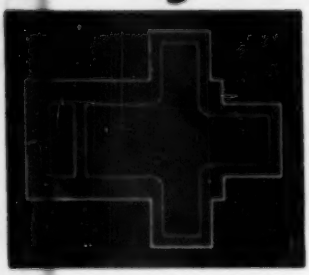
This newest of Stroman Furnaces is a combination of breakdown and holding furnaces. It's two in one . . . and the most economic ever designed for aluminum melting. The MC Furnace is of the reverberatory type. It can be fired by either gas or oil or with combination burners, so that it is a simple matter to switch from oil to gas or vice-versa. Fuel costs are reduced to unheard of lows. Combustion which is generally exhausted in ordinary furnace designs, is used in this furnace to pre-heat and melt the metal charge. No cold metal reaches the bath of molten aluminum, assuring fastest melting and uniform temperature of bath.

It is ideal for Die Casting, Permanent Mold and Sand Casting Plants. It is the zenith of speedy, efficient operation. Hot metal is ALWAYS available for dipping. Built to accommodate 500 to 4000 lbs. metal bath, the dip-out boxes are placed around the furnace so that three to six die casting or permanent mold stations may be easily operated with a single MC Furnace.

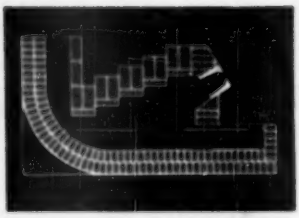
The Model MC brings "Good Housekeeping" to your plant. For returns, gates, risers, may be immediately returned to the hopper with the ingot . . . Creates Ideal Working Conditions, for furnace radiates very little heat . . . Lowest Maintenance, no iron pots or crucibles to replace, no breakdowns . . . Minimum formation of dross . . . Finest quality castings, every time . . . Furnace is delivered as complete unit, ready to melt. Complete Automatic Controls available if desired.

Compare floor space required for one Stroman Model MC to three breakdown and three holding furnaces to supply the same amount of molten metal. A tremendous saving in square feet, as well as man hours and metal saved in transferring from breakdown to holding.

Cut your aluminum melting costs to the bone . . . Let Stroman Engineers show you how this great production furnace will fit into your plant and boost profits to new highs. Write today for full information and specification. Do it NOW.

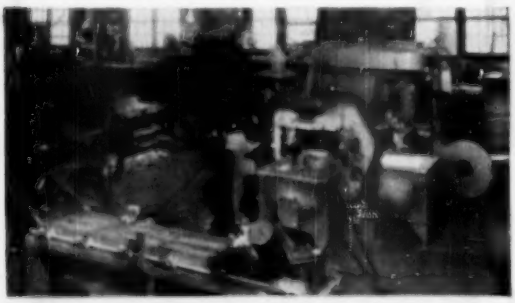


Horizontal View Showing 3 Dip-Out Boxes

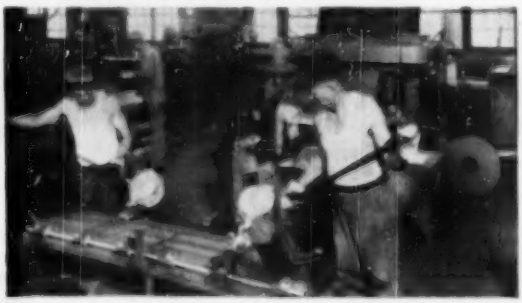


Vertical View Showing Combustion Chamber, Metal Bath and Charging Hopper.

Stroman Model MC Furnace illustrated has a 3000 lb. Metal Bath.



Small floor space still allows up to six men to work with ample elbow room.



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DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

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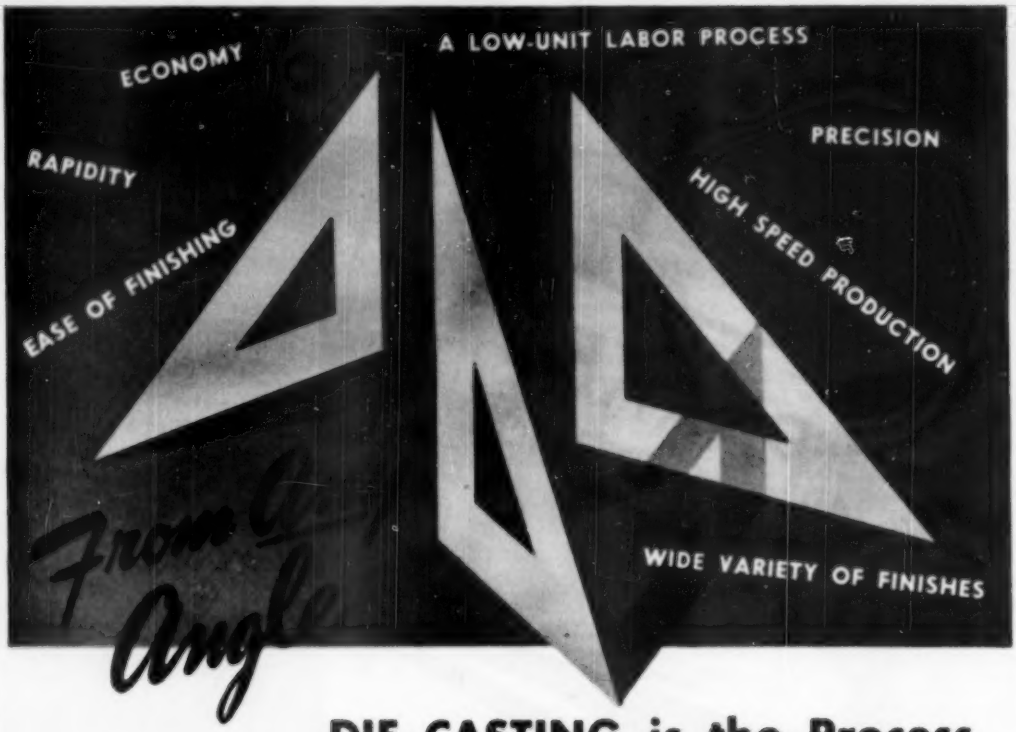
Send for this FREE *Booklet which tells of* PARKER'S *16 Point Production Control . . . and what it can do for you.*

PARKER'S 16 Point Production Control program is your assurance of perfect die castings, exactly to your specifications. Find out how the PARKER program works. Use PARKER'S facilities on your next die casting problem. Send for the FREE booklet today!

PARKER WHITE-METAL CO. - 2144 McKinley Ave. - Erie, Pa.

PARKER ALUMINUM *and* ZINC *Die Castings*



DIE CASTING is the Process ZINC, the Metal

Behind the enormous increase in the use of zinc base die castings are valid reasons—from both functional and production aspects. Whether a manufacturer's ultimate object is product improvement or economy, the die casting process plus the inherent characteristics of zinc have, in countless instances, made it possible to achieve both objects simultaneously.

Die casting, aptly named "the shortest distance between raw material and finished product," is industry's newest high-speed, low-cost production tool. Zinc provides die castings with the required strength and stability. Low cost and better dimensional control are obtained by virtue of the longer die life and higher production speeds made possible by the low melting point zinc base alloys. Moreover, because of their smooth, fine, grain, a large variety of beautiful metallic and organic finishes can be applied to zinc base die castings at low cost—thereby increasing the finished product's salability.

DIE CASTING is the Process... ZINC, the Metal... BUNKER HILL, the Preferred Zinc

BUNKER HILL 99.99+% ZINC

EASTERN SALES AGENTS ST. JOSEPH LEAD COMPANY 250 PARK AVENUE, NEW YORK 17
SALES OFFICE FOR PACIFIC COAST NORTHWEST LEAD COMPANY SEATTLE, WASH.

This CERTIFICATION SEAL identifies die castings produced from proper zinc alloys with adequate processing controls

How Buyers Profit from Dealing with Producers who subscribe to the Certified Zinc Alloy Plan . . . .

Useful physical properties of zinc die castings can be fully realized only when definite rules for alloy control are rigidly followed.

That is why the ADCI has developed a comprehensive certification plan to permit users to identify die castings produced in plants maintaining proper control.

This mark of quality means a casting meets the *"ow grade"* requirements of ASTM standard specifications.

Regular Sampling and Analysis Assures Continuous Conformance to Definite Composition Limits . . .

The Plan provides for systematic sampling of castings from all participating die casting producers and spectrographic analyses by the approved laboratory of ADCI.

A producer can use this Seal on his castings and in his advertising *only* if the analyses show he maintains the standards specified.

Thus industry has available a metallurgical yardstick which assures purchasers of obtaining die castings of proper chemical composition.

(A bulletin describing the Certified Zinc Alloy Plan is available on request)

Only these die casters under THE CERTIFIED ZINC ALLOY PLAN are licensed to use the Quality Certification Seal . . .

A & A Die Cast and Plastic Molds Co., West Los Angeles, Calif.
The Accurate Die Casting Co., Cleveland, Ohio
Advance Precision Castings, Inc., Brooklyn, N. Y.
Advance Tool & Die Casting Co., Milwaukee, Wis.

Badger Die Casting Co., Milwaukee, Wis.

Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Cleveland Hardware & Forging Co., Cleveland, Ohio
Congress Driver Division, Yale Corp., Detroit, Mich.
Continental Die Casting Corp., Detroit, Mich.
Division of F. L. Jacobs Co.
Crown City Die Casting Co., Pasadena, Calif.

Doehler-Jarvis Corp., Pottstown, Penna.
Doehler-Jarvis Corp., Toledo, Ohio
Doehler-Jarvis Corp., Chicago, Ill.
Dulin Corporation, Irvington, N. J.
Du-Wel Metal Products, Inc., Bangor, Mich.

Fanner Manufacturing Co., Inc., Whittier, Calif.
Federal Die Casting Co., Chicago, Ill.

Glenoyle Products Corporation, Detroit, Mich.
Globe Imperial Corporation, Rockford, Ill.
C. M. Gray Mfg. Co., East Orange, N. J.

Harrell Corporation, Los Angeles, Calif.
Harrell Midwest Corporation, Chicago, Ill.
Hatch Die Casting Corporation, Chicago, Ill.
Hillinger Corporation, Toledo, Ohio
The Hoover Company, North Canton, Ohio

Komin Die Casting & Mfg. Co., Chicago, Ill.
Kuhn Corporation, Marshalltown, Iowa

Madison-Kipp Corporation, Madison, Wis.
Milwaukee Die Casting Co., Milwaukee, Wis.
Modern Die Casting Corp., Chicago, Ill.
Monarch Aluminum Mfg. Co., Cleveland, Ohio
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.

Nee Products Corp., Benton Harbor, Mich.

Paragon Die Casting Co., Chicago, Ill.
Parker White Metal Co., Erie, Penna.
Peckinpaugh Metals Corp., Cleveland, Ohio
Precision Castings Co., Inc., Syracuse, N. Y.
Precision Castings Co., Inc., Cleveland, Ohio
Pressure Castings, Inc., Cleveland, Ohio

Racine Die Casting Co., Racine, Wis.
Reed Metal Crafts, Chicago, Ill.

St. Louis Die Casting Corp., St. Louis, Mo.
Schultz Die Casting Co., Toledo, Ohio
Sterling Die Casting Co., Inc., Brooklyn, N. Y.
Stewart Die Casting Div. of Stewart Warner Corp., Bridgeport, Conn.
Stewart Die Casting Division of Stewart Warner Corp., Chicago, Ill.

Stroh Die Moulded Casting Co., Milwaukee, Wis.
The Superior Die Casting Co., Cleveland, O.

The Tool-Die Engineering Co., Cleveland, Ohio
Twin City Die Casting Co., Minneapolis, Minn.

Union Die Casting Co., Ltd., Los Angeles, Calif.
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- No copper, nickel contamination
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Latest triumph of metallurgy—tough, fine-grained AMERA-MAG steel has qualities that make it best news for magnesium foundrymen in years!

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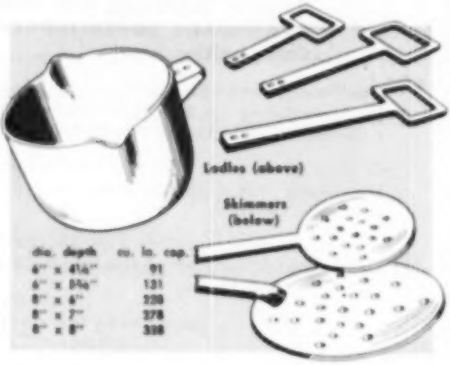


THE American TANK & FABRICATING CO.
John J. Ripich, President
2394 SCRANTON ROAD
K. J. Humberstone, Chief Metallurgist
CLEVELAND 13, OHIO

ANNOUNCEMENT

Precision Castings Company

E-X-P-A-N-D-S

• Controlling interest of Reed Metal Crafts, Inc. of Chicago, Illinois, has been purchased by the Company.

Increasing demand for Precision Castings and our desire constantly to improve service and deliveries to our customers in the Chicago and Mid-west areas resulted in this expansion move. The new facility will be standardized and supplemented further by additional equipment for plating, painting and machining.

The Reed Metal Crafts organization, headed by Roe F. Reed will remain intact by reason of the fine reputation it has with its customers for service and quality.

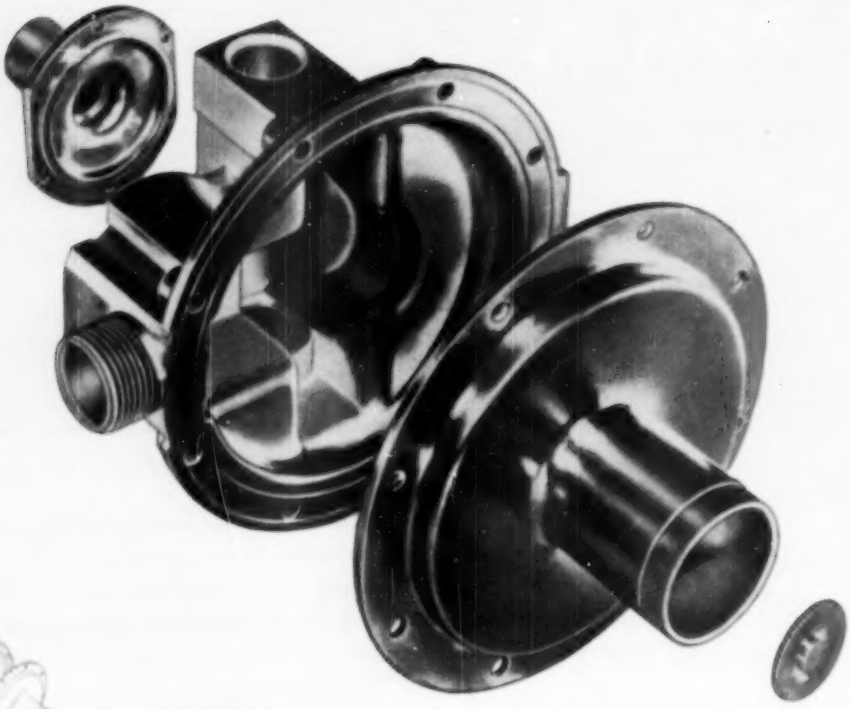
With plants at Fayetteville and Syracuse, New York, Cleveland, Ohio, and Chicago, Illinois, Precision has complete facilities to provide the best service and deliveries to all its customers in the East, Central, and Mid-west areas.

• We also announce our affiliation with the Wolverhampton Die Casting Co. Ltd., of Wolverhampton England, for the exchange of certain outstanding developments in finishing processes. The Wolverhampton Company is the largest commercial die caster in the British Isles or Continental Europe. In spite of difficult economic and labor conditions existing in Britain, they have proven themselves most resourceful in new developments which can be extremely useful in this Country. By the same token, officials of the Wolverhampton Company feel that developments of the Precision Castings Company in the field of large and intricate die castings will be very helpful in improving the British economy.

Precision Castings Co., Inc.

212 Walnut St., Fayetteville, N. Y.

Syracuse, N. Y. • Cleveland, Ohio • Kalamazoo, Mich. • Chicago, Ill.



DIE CAST BY HOOVER TO CUT COST, LENGTHEN LIFE

This gas regulator, made by a leading company, is assembled with zinc parts which are die cast by Hoover.

The lower body, weighing about two pounds, is made from a single-cavity die. The upper body, about three-quarters of a pound, is made from a two-cavity die. An eight-cavity combination die is used to cast the component parts.

These and two other Hoover die-cast parts mean fast, simple and accurate assembly. They also add to the life and efficiency of the regulator.

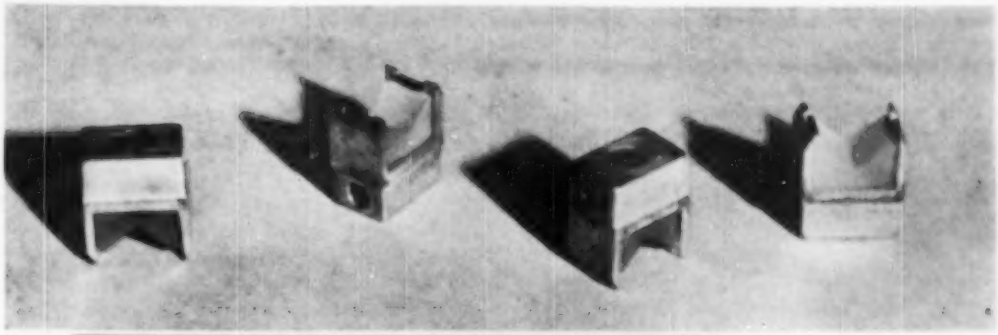
Perhaps we can give your product these same advantages with zinc or aluminum die castings.

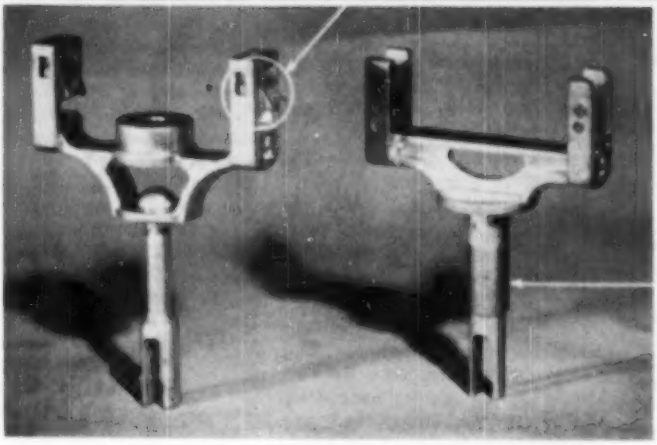
With 28 years of die casting experience, we may be able to increase the efficiency of your product by reducing costs and improving sales appeal.

Write and ask a Hoover sales engineer to call on you. No obligation, of course.

THE HOOVER COMPANY • Die Casting Division • North Canton, Ohio

SPECIALISTS IN THE FIELD OF DIE CASTING HOOVER





The small natural agate bearings with V groove, shown above, are retained in die cast zinc holders. Top edges of the die castings are pressed over to clamp the agates firmly in place. This unit permits self-alignment of the balance knife edges.

In the circle, *left*, is indicated the self-aligning bearing construction. Notice the cored vertical slots in which the bearing holder is allowed to ride. Also notice the cast external thread on the shank of the center bearing support.

BALANCED PRODUCTION

IN the production of the Ohaus Triple Beam Laboratory Balance, die castings have replaced the conventional cast iron and brass parts in order to give a highly standardized unit. This precision instrument has thereby been adapted to mass production, and costs have been reduced to a point where the scale is in a price range acceptable to most users of such apparatus.

The Ohaus balance has been designed for ultra modern appearance in keeping with scientific laboratory or classroom surroundings. Here again, die castings have been the answer to a vexing problem so often encountered in the older methods of manufacture.

Streamlined contours, together with a modern hammer-type baked enamel, result in a clean, attractive appearance appropriate for the purposes of the instrument.

Every part of the scale is built of die castings in Zamak No. 3 alloy. Minimum machining is required to prepare these parts for assembly.

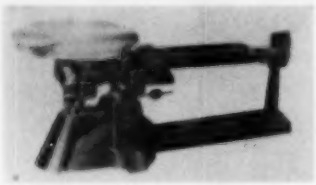
The achievement of its patented self-aligning bearing construction for the knife edges is greatly simplified in production because zinc die castings have been utilized. Similarly, the construction of the triple beam itself is an accomplishment of the die casting process, minimizing the number of machining and assembling operations which are needed.

Rigid, Reinforced Base

The base of the Ohaus balance is a single die casting, in which almost all holes are cored, ready for final assembly. The tapping of one hole is the only machining required.

Rigidity and stability are among the requirements for this casting, which serves to hold the balancing mechanism. By the use of generous cross-ribbing on the underside, and the provision of thickened sec-

tions around the holes for the bearing support, this piece has been strengthened and made rigid. The thin, uniform wall section over most of the area of



Even in such functional equipment as a lab balance, modern appearance is important. The sculptured contours of this unit are readily obtained by die casting

the base casting is in keeping with good die casting practice as a means of producing uniform metal flow, and hence, sound internal structure.

Unit Construction of Beam

Die casting has made possible the unit construction of the beam, with the central beam formed as an integral part of the portion which retains the knife edges. This is another example of the standardization of lab balance parts for large quantity production.

The four knife edges are pressed into drilled holes; the two outer beams are assembled by means of machine screws. A cross member formed at the outer end of the beam makes the mounting and alignment of the outer beams a simple production operation.

Since the main frame of the triple beam is die cast in a single piece, greater rigidity and ruggedness are possible. This eliminates many fabricated joints which might eventually become loose or out of adjustment.

In a recessed panel along the central beam are formed a series of raised numerals which eliminates the stamping and marking of this piece. The beam is chrome plated and then black paint is wiped into the recess. This sets off the numerals and makes them clearly legible.

Here again, only very light machining is necessary.

As mentioned above, the patented self-aligning agate bearing construction is a distinctive feature of Ohaus balances. Each bearing is retained in a small die cast holder. The die castings have rectangular recesses into which the agates fit. Beveled edges of the casting extend up above the bearings, and are pressed over to form a lip which clamps the bearing firmly.

A through hole cored across beneath the agate bearing receives a pin upon which the bearing can swivel to permit self alignment. The pin, extending from each side of the bearing housing, fits into cored slots in the center bearing support and parallel loop.

This bearing construction, made practical by die casting, distributes wear over a larger surface and maintains accuracy and sensitivity for a longer period of time.

Recesses and Slots Cored

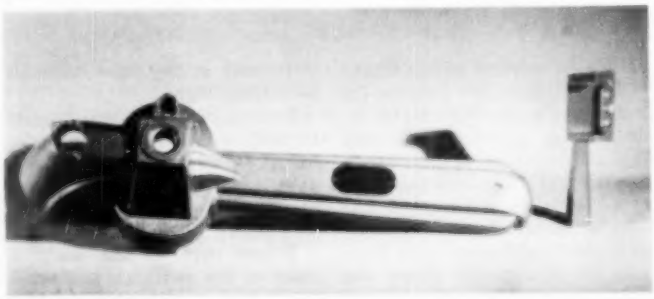
The end parallel bearing loop is cast with all recesses and slots for the self-aligning bearing cast to dimension. The only machining on this complex part is the drilling of three holes and the tapping of one.

Similarly, the center bearing support is cast complete with slots and recesses for the self-aligning bearings. A pair of stamped dust covers fit snugly down over the bearing housings to prevent foreign matter from injuring the bearing or knife edges. Small dimples cast into the bearing housings receive points formed in the dust covers, gripping the covers firmly.

The lower hub of the center bearing support is cast with an external thread which is used as a means of fastening this member to the base. Here, again, drilling and tapping are the only secondary operations.

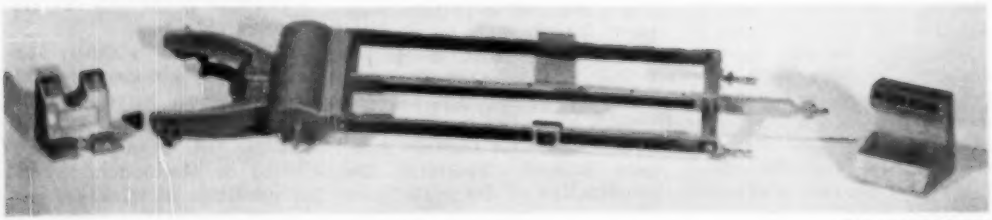
The two sliding balance weights are die cast, and con-

(Continued on Page 51)



Cross ribbing on the underside of this thin-walled base casting, right, help to make it rigid. Finish is an attractive hammer-type baked enamel.

Unitary construction of the triple beam is possible because the main frame can be die cast. Center beam has numbering as cast. Knife blades are pressed in and two outer beams attached with screws. This eliminates many separate fabricating operations.



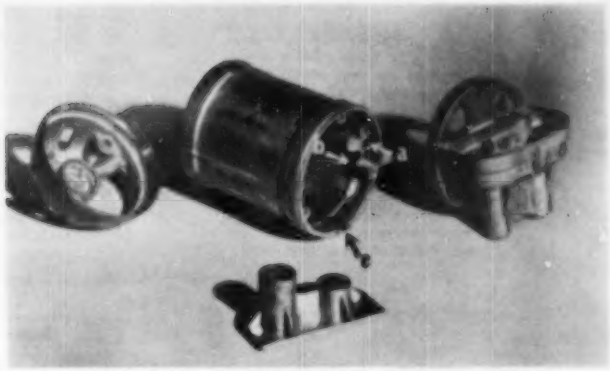
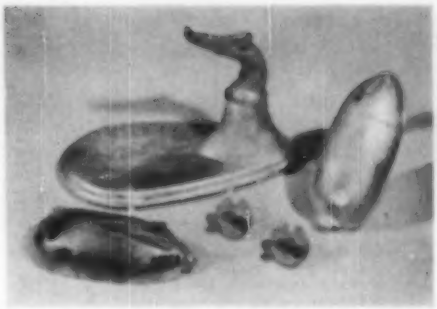


Figure 1, above. Motor and gear housing and gear cover are die cast in zinc. Die cast or stamped shell fits over assembled motor unit, permitting variations in styling, as well as providing extra protection and insulation. Formation of mounting bosses at a) and b) by interlocking cores provides mounting for the field and brush and for the gear box assembly. Indicated at c) is a small ear used for locating the gear housing radially. Holes at d) are metal savers which also aid in ventilation.

Figure 2, below. The base, bell arm and index pin, as well as the two halves of the outer shell are die cast in zinc. Little machining is required.



Uniform parts assure rapid production

THE Dormeyer Corporation produces many models of food mixers. Its production lines are kept busy turning out thousands of units per week.

To keep this large-scale production of different models moving along at an uninterrupted pace, maximum uniformity and interchangeability of parts is called for. Dormeyer engineers get this uniformity by using die cast zinc or aluminum for certain basic parts such as motor and gear housings as well as for the outer shells, bases, arms and accessories.

The set of die cast zinc parts for a motor housing, Figure 1, is an excellent example of this type of designing. The dependability of cored hole location and mounting surfaces from one set of castings to the next, and from part to part, makes possible maximum economy.

In the Model 3600, the motor housing unit is mounted inside of a shell made up of two zinc die castings, Figure 2. This double housing offers additional air space for ventilation and also increases the shielding of all electrical parts.

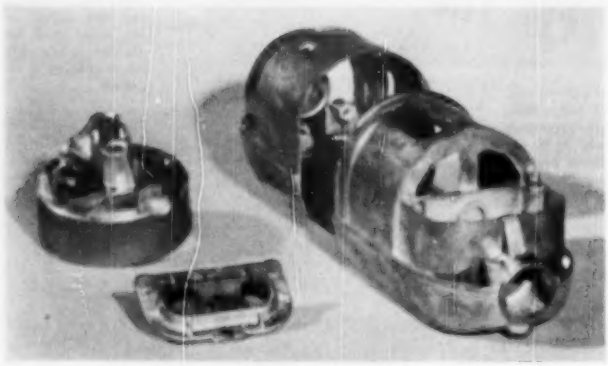
The six die castings shown in Figures 1 and 2 have been designed to make the most of the die casting process for the simplification of machining and assembling.

At each end of the motor housing, for example, are small, flat lugs which mate with recesses in the end bell and gear box which enclose the open ends of the housing. This arrangement, obtained without any machining or special fixtures, serves to locate all three components radially. Tolerances here are held very close, the lugs being cast to -.002 and the recesses for the lugs to + .002.

Notice also the formation of five lugs at the gear box end of the motor housing, Figure 1. A

Figure 3, left. Die cast motor housing for the Model 4200 is divided into front and rear halves, covered with a stamped shell.

Figure 4. The separate die castings which go into the mixer shown in Figure 3, include front and rear motor housing, brush and field bearing support, and gear case cover.



clever overlocking of the two cores which form the interior of the casting, forms the three lugs for the gear box assembly and two lugs to locate the field and brush. Long screws extending in through the end bell, are received by cored holes in these two lugs, providing a means of assembling the field and brushes very rapidly.

The only significant machining on the motor housing is to bore the center to ensure concentricity of the field within the housing. A multiple boring tool also faces the mating end of the housing simultaneously.

The gear box die casting requires only sizing of the vertical bearing holes by reaming, followed by burnishing by pressing a sizing ball through. Locating from these holes, to establish perpendicular relationship, the top surface is milled.

The upper shell which covers the gear box is self locating, as cast, and fits down firmly for grease seal without machining. Only the two bearing holes are machined.

Zinc for Bearings

The die cast zinc alloy is a satisfactory bearing metal and can be used without the need for bushing inserts. Zinc has been used for many of these parts, rather than aluminum, even though electric mixers are portable appliances, because a certain amount of weight for stability is desirable. In other models of larger size or different design, it has been found preferable to use aluminum for weight reduction. The alternative choice of zinc or aluminum permits Dormeyer to build mixers within desired weight limitations.

It is worth noting here that Dormeyer maintains all dies for past models, plus the tooling for production. They maintain a permanent replacement and service function. Wherever possible, production fixtures are portable, not being attached to the bench or machine. This method permits the quickest change of set-ups for versatility of production.

Three other die castings for the Model 3600 include the base, ball arm and index pin. The base is a well-ribbed piece which provides stability for the entire mixer. The index pin and ball arm which are mounted in a well cored into the upright portion of the base, permit rotary adjustment of the mixer.

Another mixer, the Model 4200, is built with an entirely different type of motor housing. This housing, consisting of two die castings, is divided into a front and rear half, with integral bearing holes and gear box.

Built-in Features

These two castings, together with a separate die cast brush, field and bearing support, not only house the motor and gear assembly, but also form the lower portion of the mixer housing. A sheet metal shell fits over the top half.

Here, again, as in the other models, every possible built-in feature has been incorporated as part of the die cast parts, eliminating the need for unnecessary machining and assembling. Ribs to center the field, holes for mounting and fastening, openings for electrical connections and the special hinging arrangement for tilting the mixer head are all included.

The upright support arm with its special conformation to mate with the hinge on the motor housing, is also die cast, as is the accessory food grinder attachment. These castings represent the irregular shapes which are particularly economical to produce by the die casting process.

The food grinder is a difficult coring job, die cast in aluminum because it is used in contact with food. An economical method of finishing has been chosen for the food grinder, tumbled with soap, chamois and wood chips after machining to impart a brightly burnished surface which is attractive and easy to keep clean.

Die castings are used throughout the Dormeyer line of electric mixers because they lend themselves readily to large quantity production. The accurate, intricate shapes move along the assembly lines with a minimum of hand fitting and adjustment.

The Detecto Baby Scale (Model No. 441T) is manufactured by Detecto Scales, Inc., Brooklyn, N. Y. This attractive, precision made scale weighs every ounce accurately up to 24 lbs. Features are an easy to read dial and a curved tray, designed for baby's comfort. Shipping weight is 8 lbs.

This sturdy zinc base die casting houses the mechanism for the new Detecto Baby Scale (shown) and the Detecto Household Scale (not shown). Features of the casting are accuracy in detail (the embossed name, "Detecto," is part of the casting), a naturally smooth finish, high strength and excellent corrosion resistance.

You can Gain Strength AND LOSE WEIGHT with ZINC BASE DIE CASTINGS

LIKE DETECTO SCALES, INC., you can put extra strength into products, cut unnecessary weight and gain many production economies by using zinc base die castings.

By combining thick and thin sections in a single zinc alloy casting, you can have more metal for extra strength at points of greatest stress. Wherever high strength is not needed, you can have a thin section that saves metal and reduces weight.

Satin smooth finish that readily takes and holds paint or plating is an integral part of each zinc casting. A multitude of intricate sections, deep coring, slots – even the *name* of your product—can be included in one quick casting operation.

When you figure the reduction in machining operations, finishing . . . the sales appeal of corrosion resistant metal . . . zinc base die castings have a lot to offer.

Anaconda does not make die castings, but supplies Anaconda Electric® Zinc, 99.99+% pure, to the die casting industry.

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TAXI METER PARTS { Housing / Internal / Function

A NEW type of taxi meter, designed to be actuated by the motor transmission and a built-in electric timing mechanism, is utilizing zinc alloy die castings for practically every category of components:

1. *Housing parts*, finished in a combination of bright and satin chrome plate, as well as baked synthetic enamels;

2. *Internal framework* for accurate mounting and positioning of the entire mechanism; and

3. *Small functioning parts* including power transmission elements, cams, ratchets and bearings.

This new unit is the Electro-Meter, Figure 1, manufactured by The Viking Tool & Machine Corporation, Belleville, N. J. The meter is driven by flexible shaft from the transmission while the taxi is moving faster than a specified rate of speed, but automatically reverts to clockwork actuation when moving slower than that speed.

The majority of the twenty-odd parts which are die cast can be used as cast or with only drilling and tapping performed on them. This represents a major source of economy in an instrument which includes many complex parts built to close tolerances.

The design of this unit is likely to remain stable for many years and therefore, although production quantities are not likely to approach the totals reached by the motor car and hardware industries, die amor-

Figure 1. Despite relatively limited annual production, tool costs can be written off over a longer period than usual due to stability of the design of this Electro-Meter.

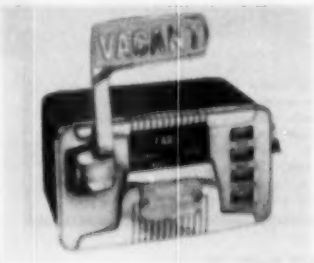

Figure 2a. Mating bosses of front and rear plates are forced into aluminum sleeves for assembling. Diameter, height and center distances on all eight bosses are held so closely to dimension that no machining is necessary, even though parallel relationships between the two plates are critical.

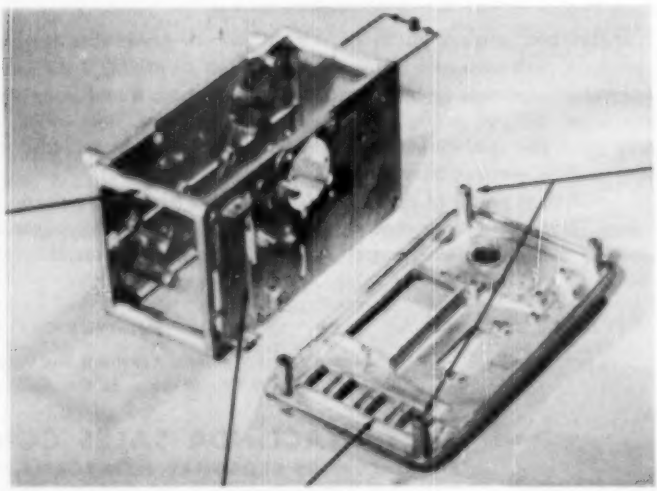

Figure 2c. Shoulder on bosses at opposite corners fit into cored countersunk holes, serving to locate the two castings together accurately. Neither drilling, reaming nor hollow milling are required.

Figure 2b. Four mileage counters are mounted against rib as indicated by arrow at *left*. A single set screw through an end boss locks them firmly into place. Position of ribs on front plate, and cored holes on cover, as indicated by arrow at right, is so close that mileage counters fit into openings without any machining.

framework

ng parts

tization can be spread out safely over a longer period of time. The high initial die cost may largely be offset, also, by the fact that relatively little investment in machine tools will be required.

Zinc alloys have been selected for these parts for several specific reasons: first, the exterior parts which are to be chrome plated can be finished more readily if they are cast in zinc; second, dies for the lower temperature alloys cost less to build and maintain; and third, the mechanical properties of the zinc base alloys will meet specifications for dimensional stability and strength.

One of the first problems in the design of such equipment is to provide a suitable framework for mounting the mechanism. The establishment of precise center distances and parallel planes is important in order that moving parts may be properly related.

The framework for the Electro-Meter consists of three parallel plates, as illustrated in Figure 2. These are a rear plate, front plate and face plate, each of which must be accurately located in relation to the others.

Both the front and rear plate have long, hollow bosses at each corner; these bosses are butted against each other, and are held together by being driven into aluminum sleeves. The distance from the top of each boss to the inner surface of the front and rear plates is very critical, being held to ±.003 without any machining.

An interesting point to be observed is that the top of these bosses whose dimension is of critical importance, serve also as ejector pads. Ejector sleeves around the cores for the hollow bosses, help to eject the castings without distortion.

Also of critical importance is the relationship of center distances between shaft holes. The front and rear plates provide the mounting surfaces for the pillow block for the driving gear, as well as the complete

(Continued on Page 11)

Figure 3. Three zinc castings are shown as cast, right, and as finished, left. Front cover and signal flag are given a combination of sand blasting for recessed areas, and polish on raised surfaces—then chrome plated. Rear of housing is sprayed with hammer-type synthetic enamel.

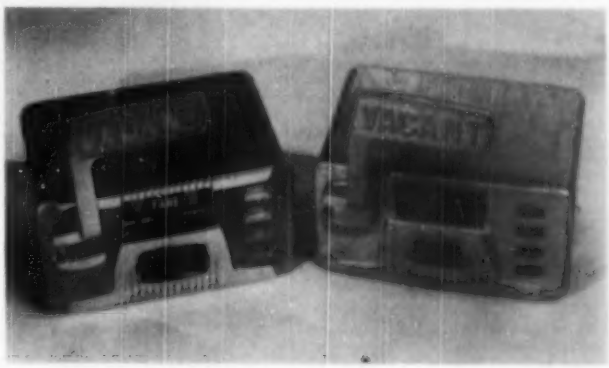

Figure 4a. Hollow boss for oil wick to lubricate cast-in bushing is formed by core which fits against the bushing so snugly that no flash is formed across the exposed surface of the bronze.

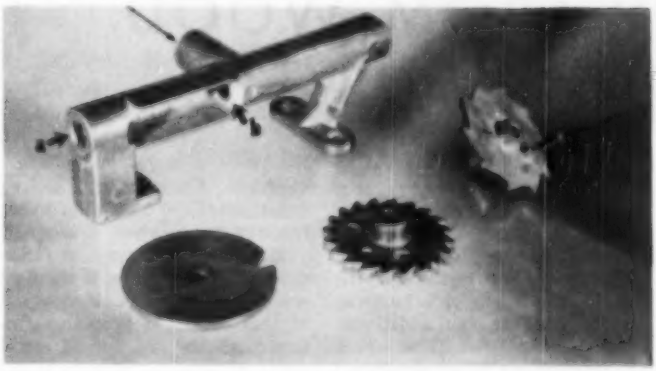

Figure 4b. This special ratchet with eccentric boss is typical of the many small power transmission elements which are die cast.

Figure 4. Two oilless bronze bushings are cast as inserts in the pillow block, as indicated by arrows a1 and b1. These bushings are supported on cores from opposite sides, but align so accurately that it is not necessary to line ream for the worm gear shaft.

Figure 1. Wood is difficult to fabricate into complex or subtle shapes. Box-like form of old model, *left* reveals limitations of wood housings.

Figure 2, *right*. More compact, better looking and more durably finished—the new Executone intercommunication unit owes a great deal of its functional improvement to the use of die cast housing parts.

Figure 3b. Close accuracy between cored openings in replaceable grille, and the position of call-buttons is a primarily consideration. Grille and call-buttons are quickly interchangeable to increase or decrease the number of stations.

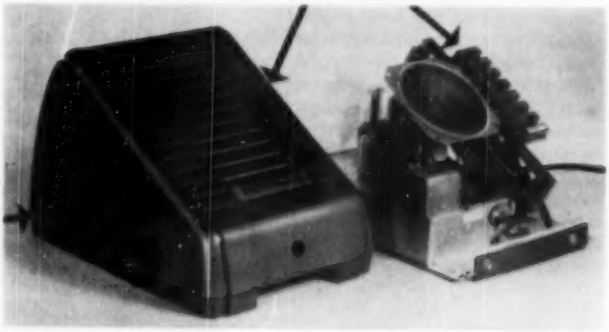

Figure 3a. Die parting falls part way up the housing. This calls for more expensive tool than if parting were to fall along the base, but results in more compact appearance. Reverse direction of bottom picks up desk reflection and causes a two-tone effect.

REDESIGN FROM WOOD TO DIE CASTINGS

THE complete uniformity and interchangeability of die cast parts has been an important factor in the design of the new Executone expandable intercommunication system which can be enlarged to include additional stations. This innovation permits the adaptation of the intercom system to changing conditions in the plant or office without sacrificing the original investment in equipment.

It is necessary only to replace the die cast front grille with one having the correct number of switch apertures, to unplug the switch panel and replace it with one having more call buttons, and to hook in the additional stations as desired. The whole changeover can be accomplished in a matter of minutes.

Executone Inc. has depended upon die cast zinc housing components for several other advantages, however, ranging from simplified assembly to attractive appearance.

Before redesigning, the Executone units were housed in wood, Figure 1. A comparison of this old style executive station with the redesigned metal unit, Figure 2, reveals immediately the improvement in appearance, compactness and efficient arrangement of control switches. Wood construction

would not have lent itself to the new principle of replaceable units—this required the type of precision fabrication which is characteristic of the die casting process.

In the first place, wood is a difficult material to fabricate because it cannot easily be adapted to complex shapes; also there is greater production line loss due to cracking or breaking.

The die cast housing offers ready-made mounting surfaces, bosses and holes. There is a minimum of secondary machining or hand fitting. Figure 3 shows the die cast housing removed from the mechanism. This is accomplished simply by removing four Phillips head screws from the bottom corners.

This is an eight-button arrangement. It is of critical importance that the openings in the die cast grille line up accurately with the switches to prevent catching or binding of the switch selector knobs inside the holes.

Although there is only one standard die cast housing for the executive station, there are three replaceable grilles having 12 openings, 8 openings or no openings for switches, as desired. The dimensional and flatness tolerances on these grilles, as well as the locating surfaces inside the housing, are held within close limits, thus assuring proper clearance for the switches.

Simplified Assembly Methods

The use of die cast housing parts has also permitted the use of simplified assembly methods, contributing to production line efficiency. Two types of fasteners in particular have proven to be well suited to this type of material and have been utilized wherever possible by Executone engineers.

As illustrated in Figure 4 showing the underside of the die cast housing, thread cutting screws and Tinnerman Speed Nuts have provided rapid assembling. It will be noticed that the grille has been attached by means of four thread cutting screws which give a secure anchor into the die cast metal. The screw holes are cored to size, and since the screws cut their own threads, there is need for neither drilling nor tapping.

Along the outer edges of the grille are four small, angular bosses which can be seen more easily in Figure 5. These bosses line up next to round bosses inside the housing. A Speed Nut slipped over each round boss presses down against the angular boss, thus retaining and aligning the grille.

Speed Nuts are used also for attaching the grille cloth. The cloth is stapled to a stiff backing material, and the whole piece then slipped over four bosses formed on the underside of the grille, Figures 4 and 5. Four Speed Nuts over these bosses clamp the grille cloth and backing tightly into position. The lower two fasteners also hold the stamped hinge plate for the "Press-to-Talk" switch.

Thin, Uniform Walls

Following accepted design principles, the wall sections of the die castings have been kept as nearly uniform as possible to obtain sound castings with superior surface finish. Zinc is used rather than aluminum, not only because of the better surface, but also because the additional weight helps to stabilize the unit on the desk when finger pressure is applied to the switches.

The die parting for the large housing, it will be observed, does not occur at the bottom edge, which would have given the simplest die construction. The die parting occurs part way up the casting to accommodate a reverse angle at the base.

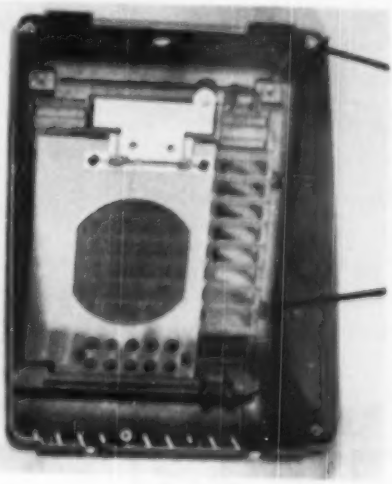

Figure 4a. Corner holes are drilled and then self - tapping screws are driven in to save tapping operations. These screws can be removed and redriven for servicing without damaging the threaded holes.

Figure 4b. Small cast bosses with Speed Nuts clipped over them are used for attaching the grille die casting, and also for attaching the fibre-backed cloth.

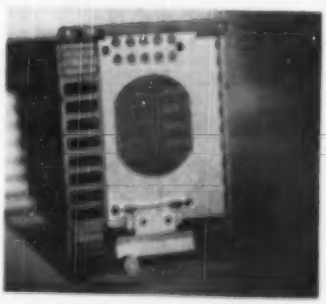

Figure 5, right. Flatness and dimensional regularity of the grille is important because this die casting can be removed and replaced when the number of stations in to be changed. Three interchangeable die cast grilles are available, each with a different number of cored slots.

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THE SUPERIOR DIE CASTING COMPANY

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This is not an arbitrary decision, but is based upon the improved appearance which results from the lessened dimension. This serves to emphasize the compactness of the unit by minimizing the apparent amount of desk space which it occupies.

It also provides another interesting effect. The lower portion of the housing—the part which slants inward, picks up the deep tones of the desk on which it rests, and by means of this reflection, gives the appearance of a two-tone paint job.

Designer Jack Block has used great ingenuity in planning the shape and arrangement of the unit. He has succeeded in integrating the separate switches, control buttons and grille openings into the overall shape and proportions of the unit.

The selection of an appropriate organic finish which would harmonize with office equipment and also be durable for the entire service life of the instrument was another important consideration.

Executone has chosen a type of baked paint with a metallic sheen, the Maas & Waldstein Metalustre No. 59023. The castings are prepared by vapor degreasing and then a chromic acid dip. One coat of paint is sprayed on and baked. It is not necessary to polish or grind the surface before finishing.

Minimum of Machining

Aside from drilling the four corner holes, there are no machining operations on the main housing. Trim dies are used to remove the flash.

Self-tapping screws are used in all four corners.

Staff Stations from Two Identical Castings

The staff station shown disassembled in Figure 6, is built of two identical die castings, thus economizing on initial tool costs. Here again, as in the executive station, uniformity and ease of assembly are ad-

(Continued on Page 55)

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Combining durabil y lightness with pre i for surveying tran it

MANY surveying instruments built by W. & L. E. Gurley, Troy, N. Y., are accurate within one second of arc. If projected, this represents a maximum error of ⅝ inch in a mile.

However, precision is not the only requirement of these instruments. At least three other major factors influence the design and choice of materials for this type of equipment.

In the first place, a surveyor's transit must not only *be* accurate, but must maintain its accuracy over an indefinite period of years despite all sorts of weather and climatic conditions —heat, sub-zero temperatures, dampness, dust or salt-saturated atmospheres.

Second, it must withstand rough usage. This is outdoor equipment subjected to impact and abrasion.

The third requirement — no less important than the other two to the surveyor who carries the transit around all day long —is lightness.

The combination of accuracy and ruggedness could be secured by constructing the transit of heavy-sectioned castings, forgings or fabrications in steel or bronze, extensively machined and elaborately assembled. This choice of materials would, however, fail to include one significant feature—lightness.

The way in which Gurley has been able to combine all three desirable features has been by turning to aluminum for a major group of components. And since aluminum has been picked to fulfill the physical and mechanical needs of these surveyor's transits, it is not surprising that several of the most important parts are being produced most economically by die casting.

Die cast aluminum parts include the truss standard, telescope housing and leveling spider, as well as rod targets and tripod clamps.

Lightens Foundry Load

Purchase of aluminum die castings for these critical components not only lightens the load on Gurley's own sand foundry facilities, but introduces parts onto the production line much closer to finish dimensions, thus helping to reduce the number of secondary operations.

Over and above those specific dollar-saving production advantages, aluminum die castings offer several additional benefits. For example, aluminum alloys used for these transits have greater stability and rigidity than bronze. In addition, the die casting process permits unitary construction of the mounting frame, contributing further to rigidity.

From the point of view of weight reduction, aluminum die castings have permitted a 25 percent decrease in total weight, as compared with sand cast bronze. Die cast aluminum offers additional weight saving advantage, even as compared with sand cast aluminum, due to the thin, uniform wall section which is practical by die casting.

The die cast leveling spider, designed with a ⅛ inch average wall section, has a safety factor 400-500% above the maximum tightening torque on the leveling screws. This is sufficient to protect the piece against breakage under excessive tightening loads.

On the other hand, its load limit is sufficiently below that of the bronze centers so that severe impact would result only in breakage of the die cast spider which is inexpensive to replace, rather than bending or otherwise damaging the carefully machined and fitted bronze centers.

y and
ision
its

Bronze bearings for the telescope axis are assembled into the die cast aluminum truss standard and are then bobbed on this Brown & Sharpe machine.

Structural design of this die cast standard combines maximum strength and rigidity with minimum weight by means of vertical supports with L shaped cross section.

All die castings are in alloys No. 13 or No. 360 which are not heat treatable. These are stable alloys useful for complex shapes and thin sections because of their excellent castability.

Precision of Gurley transits is obtained mainly by assembly line adjustment and hand fitting, since the various dimensional and parallel relationships would be impossible to hold due to cumulative tolerances from piece to piece.

It is for this reason that extremely close tolerances are not required for most of the die cast dimensions. Thus, although die

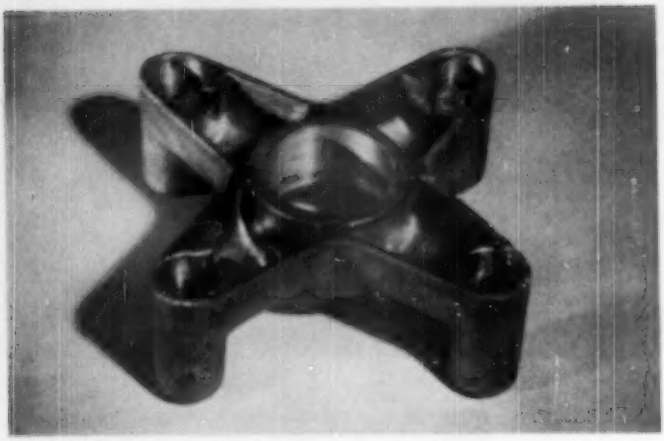
Unitary construction of the telescope housing, right, is an outstanding example of the advantage of die castings to combine the two shafts for the telescope axis, and nickel alloy leveling posts. These are cast as inserts and are accurately held for parallelism and alignment.

SURVEYING INSTRUMENTS

THE first commercial use of aluminum in the United States was the construction of an aluminum engineer's transit by W. & L. E. Gurley in 1876, ten years before the development of the electrolytic process for reduction of the metal.

For this purpose, Gurley imported 63 ounces of aluminum from France at a cost of $81.90. This transit was displayed at the Centennial Exposition in Philadelphia in 1876. Still in existence, this transit was used for fifty years.

Since that time, Gurley has taken advantage of the improvements in alloy properties and manufacturing methods. They are using aluminum successfully in constructing aeronautical, navigating and meteorological instruments, as well as industrial testing equipment for the paper and textile fields.



Considerable stress is placed upon this adjusting spider, especially when the adjusting screws may be over-tightened. Safety factor of 400-500 percent above the maximum tightening torque is designed into it.

castings are relatively accurate, as compared to other quantity production methods, little effort is made to approach finish dimensions by die casting.

The advantage which dimensional accuracy of die cast parts *does* offer, however, consists of minimizing the amount of machining, simplifying location, and standardizing parts for rapid assembling. The amount of metal removed is usually slight, requiring only a light finish cut, rather than a rough and finish sequence.

An example of this is the truss standard which serves to mount the telescope, compass, spirit levels and vertical circle. Form of the truss standard is fundamentally that of a circular mounting plate with two upright yokes.

As a sand casting, this part would require machining all over. As a die casting, the tops of the two upright yokes are straddle milled to remove draft in a single pass, three cored holes are spot faced and several dimensions on the underside are bored and faced simultaneously.

By using an "L" section for the upright members, ample rigidity and strength are attained without heavy walls. This not only saves metal and reduces weight, but provides sound grain structure and eliminates porosity. Since the densest grain structure occurs at the surface, the design of castings with thin sections can often furnish strength which is equivalent to heavier gravity-cast sections.

Square recesses formed in the tops of the two upright members receive split bronze bearings in which the telescope pivots. These bushings are adjustable for accuracy, and held in position by brass cover plates.

Primer Plus Three Coats of Lacquer

Although aluminum alloys have a high degree of corrosion resistance due to the rapid formation of a thin coating of aluminum oxide which protects the surface, the Gurley transits are given a four-coat surface finish to ensure protection under all service conditions.

The castings are first given a zinc chromate primer which is baked for one and a half hours at 310°, following which a coat of green synthetic lacquer is sprayed and allowed to air dry. It then receives one coat of black crackle lacquer and one coat of dark green crackle lacquer, each of which is air dried.

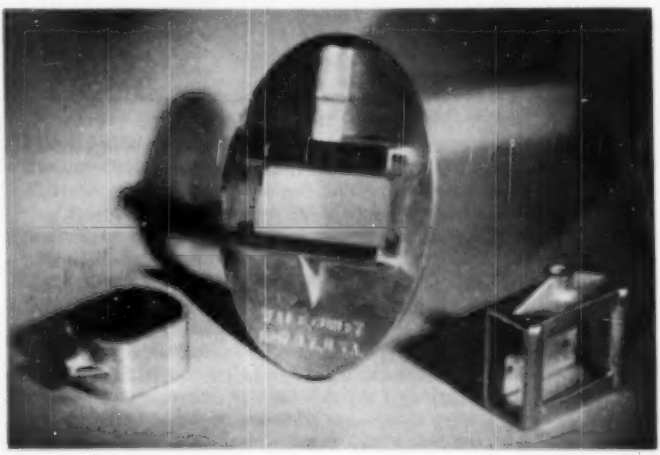
Any place in the optical system where reflection of light needs to be eliminated, a single coat of flat optical black is applied.

Unitory Construction

The telescope housing offers a good example of the use of a die casting to gain the advantages of unitary construction. This die casting not only is the shell into which the brass sleeve for internal focusing is pressed, but it provides a permanent, non-loosening assembly for the nickel alloy leveling posts and bronze bearing pivots, all of which are cast as inserts.

The brass pivots are oversize, and are turned to finish dimension. Relative position of the pivots is therefore not critical. On the other hand, the posi-

Three other die cast aluminum parts are used in surveying instruments, including rod targets and tripod clamps.



tion of the leveling posts is critical, especially with regard to perpendicular alignment. These two inserts are located accurately in the die, and require only threading.

The telescope tube is cored hollow and a thin brass liner is pressed in. The liner is approximately 1½ inches in diameter and 5½ inches in length. Inside of the telescope tube is bored out first to remove draft and establish concentricity. Several other machining operations are simple, consisting of drilling, tapping and spot facing.

As previously constructed from brass tubing, the telescope housing presented many assembly problems. One difficulty was the attaching and aligning of leveling posts. This required fixtures for locating, drilling, tapping and screwing on hangars for the posts. Considerable trouble was experienced in attempting to hold the posts in the same plane.

Furthermore, two to four screws were required for each post. Besides being more difficult to assemble, there was greater tendency to work loose.

The combination of the bearing properties of bronze with the structural strength of aluminum die castings has permitted a range of physical properties and ease of fabrication readily adapted to instrument design.

This pioneering instrument builder has used aluminum die castings wherever possible; this is one of the few production short cuts possible in a manufacturing operation characterized by extensive machining, finishing and assembling operations within close tolerances.

This company has maintained its leadership in the field of engineering and other types of instruments by a willingness to investigate and introduce into their production line the new materials and methods made available by technological advance. The excellent reputation of this company's instruments during the past century is sufficient testimony for the reliability of the materials which they use.

PRECISION EXPANDS INTO MIDWEST; BUYS CONTROL OF REED METAL CRAFTS

Controlling interest in Reed Metal Crafts, Inc., Chicago die casting concern, has been purchased by Precision Castings Co., Inc., of Fayetteville, N. Y., according to an announcement released recently by William During, president of Precision.

This brings to four the total number of facilities operated by Precision Castings for the production and finishing of die castings. Other plants are located at Syracuse, N. Y., Cleveland, Ohio and Kalamazoo, Mich.

At the same time, Mr. During has announced affiliation of Precision Castings with the Wolverhampton Die Casting Co., Ltd., of Wolverhampton, England, for the exchange of certain outstanding developments in finishing processes.

(Continued on Page 57)

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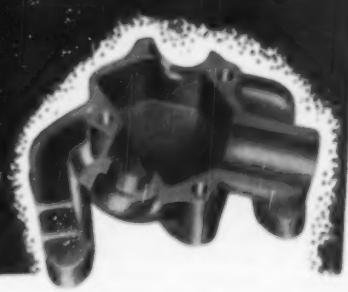
There must be a reason why so many highly discriminating manufacturers entrust *all* of their work to us. The reason is they *know* from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.

If you are located west of the Mississippi River we are in an excellent position to take care of your die casting requirements. Quotations made promptly.



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Being a piece of portable equipment, the Cameron dishwasher gets lightness by the use of aluminum die castings. At the same time, looks are improved, costs reduced and serviceability increased.

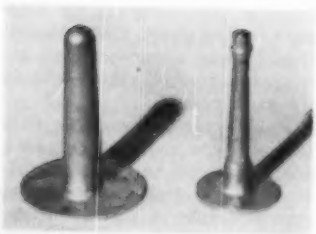
IMPROVED METHOD OF FABRICATION

A NEW dishwasher, completely powered by water from the kitchen faucet, makes use of the lightness, corrosion resistance and economy of aluminum die castings for eight major components.

This portable unit is built by the Cameron Corporation of Cleveland, Ohio, and operates on a turbine principle. The incoming jet of water spins the rack of dishes as the tub is filling with sudsy water, removing soil by a combination of agitation and detergent action. The entire wash-rinse-dry cycle is completed in five minutes.

As production quantities have approached thousands of units per month, it has been necessary to retool many parts for greater economy based on the increase in output. Die castings have replaced several stampings, sand castings and wire forms.

The result has not only been faster and less expensive production line handling, but also definite functional improvements in the dishwasher.



Center post, *right above*, holds a ball bearing in a recess at the top which is cored to a tolerance of .003 to provide a proper bearing seat. This was once produced from tube and flange assembly. At the *left*, is the hub which rides over it, also die cast.

Two views of the overflow drain. Front view, *above*, also shows drain valve and inlet die castings. With the drain valve and neoprene seal installed, *below*, the overflow assembly is complete and ready to be attached to the washer tub with three Phillips head screws.

For example, the die cast overflow channel which replaces an assembly made up of a stamping and a sand casting is much easier to seal against leakage and is simpler to remove for servicing.

The die cast overflow casting is assembled with three Phillips head screws, and has a recess around its circumference which holds the neoprene seal. The previous overflow assembly was permanently riveted to the tub and couldn't be removed if the gasketing needed repairs. It required seven rivets and three screws for assembly.

Furthermore, the new die cast overflow, which forms a central element in the appearance of the washer, is much better looking, has a smooth, polished surface and a recessed name formed as an integral part of the die casting. Previously, a decal name label was attached.

The greater rigidity of the die cast overflow piece, as compared with its stamped predecessor, provides increased durability and resistance to impact.

Two views of the overflow die casting are presented, one front and the other rear view. The entire assembly for a drain valve depends upon the die casting process. The drain casting which bears a neoprene seal on its upper surface, pivots in a cored recess in the overflow casting, and yet requires no hinge pin, no drilling or other secondary operations.

The drain valve die casting, also shown, pivots in a recess cored into the overflow casting. This provides a hinging action without any machining of hinge pin holes or bearing seat.

The drain valve die casting has a neoprene cap over its valve end which is engaged or disengaged against the drain opening by means of a die cast control knob with an eccentric mounting boss.

Each of these castings replaces some other type of fabricated part: the drain valve was previously sand cast, and the control knob was molded from plastic. This latter was unsatisfactory due to the low tensile and impact strength of the plastic material.

The center post on which the revolving basket turns, and the hub which rides over the center post, are now die cast. The post was formerly assembled from a piece of tube stock with a large flange riveted to the bottom.

The top end of the post seats a roller bearing which must be quite accurately held. Now the entire post is die cast, as shown in the illustration, and the ball bearing is pressed into a hole cored into the top. The sides of the bearing retainer are then crimped over.

The ball must ride free to minimize friction, but must not be loose. The cored hole in the top of the center post is held to a tolerance of .003 on diameter.

The entire post is formed in the die, including the flange at the base and two circumferential rings to reinforce the post.

The hub which fits over the

(Continued on Page 62)

1881
1950

What's All The EXCITEMENT *about?*

In 1881, the year Cleveland Hardware was established, everything was all right in the world. A great Faith prevailed everywhere, particularly in this Country. Oh, there were a few skirmishes in small countries that seem to thrive on revolutions, but what a world of history has been written since those "good old days."

We've witnessed wars and recessions, prosperity and depressions. Also, we have seen the greatest contributions for man's comfort and pleasure since the beginning of time. All in 68 years!

Right now some folks are worried about the Atom Bomb; others are deeply concerned over business. Cleveland-Hardware will go out on the limb of the proverbial oak and predict that "everything's going to be all right."

Frankly, we believe a certain aggressor nation hasn't quite forgotten what happened to a certain man in Germany. Labor and management will continue to kiss and make-up and the Unity Quibble in Washington would burst like a bubble if our Uncle Sam were threatened.

The old saw, "right is might," will prevail.

DIE CASTING DIVISION

The Cleveland Hardware & Forging Co.
3270 E. 79th ST., CLEVELAND, OHIO

EVERY "CLEVELAND" DIE CASTING JOB IS IMPORTANT

ANNOUNCE ANNUAL AWARDS FOR GREATEST CONTRIBUTION TO DIE CASTING INDUSTRY

An award program designed to stimulate advancements in the die casting industry from year to year has been set up by the American Die Casting Institute, it was announced here yesterday.

Made possible by a special fund donated by the Doehler-Jarvis Corporation, the program calls for a cash award of at least $500 and an appropriate plaque, to be presented each year to an individual or to a related group of individuals making the most noteworthy contribution to the industry.

The presentation will be known as the American Die Casting Institute-Annual Doehler-Award and selection of recipients of this award will be made by the Board of Directors of the Institute.

Selection of award winners will be made from nominations submitted by the industry and by technical societies, leading universities, government bodies and related trade associations.

The three main areas of activity which will be considered by the Award Committee are technical achievements, advancements in plant operations and activities in the field of public relations.

According to the award committee, eligibility for the award includes any individual, group of individuals, technical or scientific society or related committees, regardless of whether the nominees are engaged in the die casting business or are in the employ of a firm-member of the American Die Casting Institute.

Entries must be submitted each year between January 1 and April 1. The award committee will make its selection during its regular June session, and the award will be made each fall. The first award will be made at the annual meeting of the Institute, in September, 1950.

5
ACES?
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MODERN EQUIPMENT
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SERVICE
Here's a sure-fire winning hand and, with an ace to spare, it's an unbeatable combination.
Let BADGER back up your product with quality castings, exact in every way.
Expanded facilities, mechanical know-how, the ability to get a job out on time...these are your assurance of die castings when and as you want them.
DIE CASTING CORP.

100,000 NEW JOBS IN ENGINEERING SEEN IN DECADE

Jobs in engineering—the nation's third largest profession, and one of its fastest-growing occupations — may increase by as many as 100,000 in the next 10 or 12 years to a total of roughly 450,000, The American Society of Mechanical Engineers heard at its annual meeting.

Engineering school enrollments are now so high, however, that many of the graduates of the next four years may be unable to find engineering jobs, although their training may help them get administrative, sales, or other positions in industry.

These are the main conclusions of a comprehensive study

(Continued on Page 57)

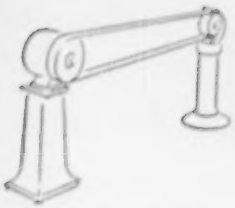
FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.



BACKSTAND-BELT GRINDING INCREASES PRODUCTION IN POLISHING AND FINISHING

The coated abrasive belt used in conjunction with a contact wheel and a backstand idler, is established as an efficient production tool. For grinding, polishing and finishing hundreds of consumer and industrial items, the backstand-belt method has proved much more efficient and economical than the old set-up wheel method.

Five Advantages

Manufacturers who have switched from the set-up wheel method point to five distinct advantages of the backstand-belt method over the set-up wheel . . .

● An abrasive belt is a scientifically made tool, manufactured under controlled atmosphere conditions by experts utilizing modern making equipment. The photomicrographs compare the crude, uncontrollable rolled-on cutting surface of typical set-up wheel (A) with the coating on an Armour Abrasive Belt (B). Note how the sharp cutting points on the factory-coated belt are exposed to provide faster, cleaner cutting action—increased production.

A B

● The coated abrasive belt cuts cooler because of the longer interval between work contacts.

● Inexperienced help can be quickly trained to operate a backstand-belt machine. Highly-skilled personnel needed to dress the set-up wheels can be used elsewhere.

● It takes only a few seconds to change an abrasive belt.

● The temperature-controlled room used for curing set-up wheels can be released for other more productive uses.

Actually, there are many more advantages to the backstand-belt method. The following is indicative of what the backstand-belt method could do for you.

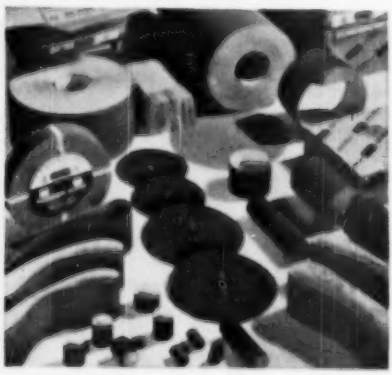
Case History

The W. L. and Metals Company had always used a hard, set-up polishing wheel on aluminum sand castings for aircraft and transportation industries. The wheels had to be inspected constantly for out-of-roundness. This caused a waste of time, closed the snagging operations.

When the company changed to the backstand-belt method, removing gates and fins from castings was no longer a drawback to production. With this new method abrasive costs were lower and the finish much better. The entire operation was speeded up fifty to sixty per cent. . . . wheels no longer needed truing.

If you are now using set-up wheels for your grinding, polishing and finishing operations, it will pay you to investigate the modern backstand-belt method. To do this, write today to the Coated Abrasives Division, Armour and Company, North Benton Road, Alliance, Ohio, for the additional information contained in our new booklet—"Facts about Backstand-Belt Grinding and Polishing."

Need Coated Abrasives? Call Armour!



Backstand belts are only one item in Armour's complete line of coated abrasives. Alundum, Garalun, Garnet and Crystolon come in rolls of paper, cloth or combination . . . in sheets for hand sanding in belts, discs, and other specialized forms.

Whatever your products or specialized needs . . . one of Armour's complete line of metal-working abrasives is *right* for you.

We recommend buying through your Industrial Distributor.

ARMOUR *Coated Abrasives Division*

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CLINIC for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

HIGHLIGHTS OF 1949 IN FINISHING DIE CASTINGS

IN THIS the beginning of the new year we believe it appropriate to review some of the highlights of die casting finishing developments of 1949 . . . trends and progress in all phases of finishing methods as reported at numerous scientific meetings and recorded in the technical literature, all of which are of interest to the production man concerned with efficiency and quality of die casting finishing operations.

In reviewing the technical developments in finishing die castings reported during 1949, among other progress achieved, one cannot help but be impressed at the progress reported in plating on magnesium and aluminum base metals. The fourth educational session of the 1949 convention of the American Electroplaters' Society featured a symposium on plating and other treatments of light alloys.

As a part of this session, H. K. DeLong, Dow Chemical Company, described some of the practical factors involved in the successful use of the new zinc immersion process for plating on magnesium alloys. According to DeLong, the most suitable solution, and conditions for applying the preplating zinc immersion coating to magnesium alloys has the following composition:

Tetrasodium pyrophosphate ($Na_4P_2O_7$)	120 g./L.
Zinc sulphate ($ZnSO_4.7H_2O$)	40 g./L.
Potassium Fluoride (KF)	7 g./L.
Potassium carbonate (K_2CO_3)	5 g./L.
Treatment time	3-5 minutes
Operating temperature	175-185° F.
pH	10.0-10.4

Solution mildly agitated.

The zinc immersion coating is followed by copper striking and electroplating in standard plating baths. Shown in Figure 1 is a magnesium die casting that has been given a conventional bright copper-nickel-chromium plated finish.

Surface Preparation of Magnesium

One of the points emphasized by DeLong in discussing the salient features of the practical operation of plating on magnesium base parts, was that the surface must be free of non-metallic contamination, such as the normal oxide or hydroxide coatings, inclusions of oxide, scale, dirt, oil and grease.

In some cases, to insure the removal of foreign materials of these type, the parts are first degreased and then pickled prior to mechanical operations such as buffing. The pickling also tends to remove inter-metallic compounds and precipitates which occur primarily in castings. To obtain a satisfactory surface condition cast parts are pickled in 75-85 per cent phosphoric acid, while wrought parts are pickled in 20 per cent acetic acid plus 5 per cent sodium nitrate.

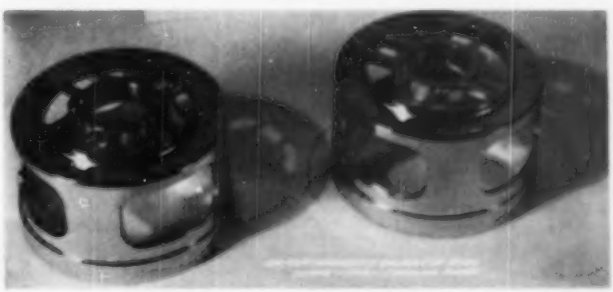
Barrel Plating Magnesium

Recent pilot plant tests conducted by Dow Chemical Company, and described before the Symposium by DeLong, have shown that small magnesium parts can be readily batch processed by barrel plating methods such as used on other metals. Copper, copper-nickel, and black nickel deposits have been applied in a conventional plating barrel. Bright barrel plated nickel, followed by rack chromium plating, is possible without the necessity for buffing the nickel before chromium plating. Barrel plating should provide an economical method of finishing many types of small magnesium parts.

Corrosion Resistance of Plated Magnesium

It was reported that copper-nickel-chromium plated magnesium parts have withstood 48-168 hours in the salt spray without failure, the time of exposure before initial failure depending on the thickness of the nickel deposit. Nickel deposits in these tests ranged from 0.0005 to 0.0015 in thickness. Silver and chromium plated test panels have withstood 90 days at 95 F., and 85-95 per cent relative humidity, with little indication of blistering or corroded areas. One important point brought out in the corrosion tests was that, in the salt spray, when failure in the plating starts in a localized area, the corrosion does not spread rapidly between the plate and the magnesium surface.

Figure 1. Die cast magnesium generator ends which have been given a conventional bright copper-nickel-chromium plated finish using the zinc immersion process. (Courtesy Dow Chemical Co.)



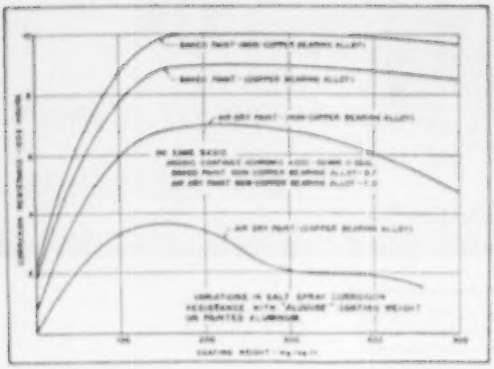


Figure 2. Variations in salt spray corrosion resistance with various amorphous phosphate coating weights on aluminum alloys based on data presented by American Chemical Paint Co. laboratories before the 1949 convention, American Electroplaters' Society.

Surface Treatment of Aluminum for Plating

Just as the proper surface treatment of magnesium prior to plating has been shown to be all important to the success of this finishing operation, data was presented during the past year which also emphasized the importance of surface conditioning in plating on aluminum alloys.

Fred Keller and Walter G. Zelley[4], Aluminum Research Laboratories, in discussing practical procedures for plating on aluminum alloys before the above mentioned Symposium at the 1949 Electroplaters' Society brought out the fact that the success of the commercial procedure is dependent on the effectiveness of the pre-plating treatments. The zinc immersion method is now considered one of the most convenient and satisfactory methods available for plating on aluminum alloys.

It was pointed out that recent developments in the procedure have been mainly in surface conditioning treatments, and the successful use of this method is, in a large measure, dependent on the type and effectiveness of the cleaning and conditioning treatments that are used for the various aluminum alloys. One of the purposes of the surface conditioning treatment is to remove certain micro-constituents, such as (Al-Mg), (Mg-Si), (Mg-Zn), and (Al-Cu-Mg), which may subsequently react during the plating operation.

The production man, concerned with plating aluminum die castings, will be particularly interested in data presented at the Electroplaters' Light Metal Treatment symposium[5] by Walter R. Meyer and S. H. Brown, Enthone Company, wherein it was pointed out that mixtures of nitric acid and hydrofluoric acid are used for conditioning aluminum alloys containing silicon such as is typical of die casting alloys. One treatment recommended for this purpose has the following composition:

Nitric acid, 36° Baume' (52.3% acid) ..... 3 gallons
Hydrofluoric acid 48-52% ..... 1 gallon

Additional data was presented by Keller and Zelley[6] before the 1949 Fall meeting of the Electrochemical Society in Chicago showing the importance of using proper surface conditioning treatments prior to application of the zinc immersion preplating coating. It was pointed out that proper procedures in this step assist in obtaining a uniform and active surface for deposition of the zinc layer pretreatment. A

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solution recommended[7] for the zinc immersion treatment consists of 525 g./L. caustic soda (commercial 76 percent) and 100 g./L. zinc oxide.

A new method for the deposition of zinc, cadmium, and tin on aluminum alloys by chemical displacement was described by Heiman[8] before the Electrodeposition Symposium of the Fall 1949 meeting of the Electrochemical Society, based on research conducted at the University of Pennsylvania. The immersion zinc deposit was described as satisfactory for application of subsequent plated coatings and is produced by dipping properly conditioned aluminum parts for 30-60 seconds at room temperature in a solution 5N in zinc sulfate and 1N in hydrofluoric acid. The immersion deposits of cadmium and tin, also produced from a metal sulfate-fluoride dip were described as being very adherent.

Cleaning

Meyer and Brown[9] pointed out that alkali cleaners for aluminum, are of two types, etching and non-etching. Etching type cleaners work rapidly and are very effective but they cause a smut to form that is frequently difficult to remove. Non-etching cleaners are much poorer cleaners than etching cleaners and they may also leave films that can be troublesome. It was also pointed out that because of the high chemical activity of aluminum the removal of heavy oil, grease, buffing compounds and solid dirt is done largely with organic cleaning agents.

Determining When a Surface Is Clean

Work was reported[5] from the Monsanto Chemical Laboratories by J. C. Harris, R. E. Kamp, and W. H. Yanko which indicated that the radioactive tracer technique can be applied in evaluation of cleaning compositions, and appears to be more sensitive than existing methods for estimation of soil removal. At an early 1949 Meeting of the Niagara Falls, New York, Section of the Electrochemical Society, O. M. Morgan, National Aniline Division, Allied Chemical and Dye Corporation, discussed a method of testing cleaner efficiency based on photographing fluorescent oil residues under ultraviolet light.

Zinc Base Die Castings

A survey of present practice in acid dips for zinc base die castings reported[1] as a part of the Third Educational Session of the 1949 Electroplaters' Convention by D. M. Overcash, Brown-Lipe Chapin Div. G.M.C., Elyria, Ohio, showed that 11 large companies finishing zinc die castings used acids and concentration ranges as follows: sulfuric acid from 0.2 to 3 percent for nine companies; seven of these had the acid between 0.5 to 1.0 percent; one firm reported 3 percent phosphoric acid was used. One firm reported citric acid was used at a concentration of 0.5 to 1 oz./gal; the time for which the parts were immersed varied in automatic plating equipment from ten to 60 seconds, and in hand dipping from three to five seconds. All dips were used at room temperatures.

Blaiwais[1] emphasized the advantages to be gained by use of bright nickel plating in finishing zinc die castings. A typical cycle for plating zinc die castings requiring a highly buffed final finish is: (1) polish out parting lines; (2) cut casting with tripoli; (3) color (optional); (4) copper plate; (5) bright nickel plate; (6) chromium or other final plate.

Chromium plating plays an important part in the final plating step in finishing die castings. Hull and Winters[1] discussed some of the factors that influence operating characteristics of chromium plating baths when plating buffed gray nickel and bright nickel.

It was pointed out that for best results in securing the widest plating range over nickel, with the simplest

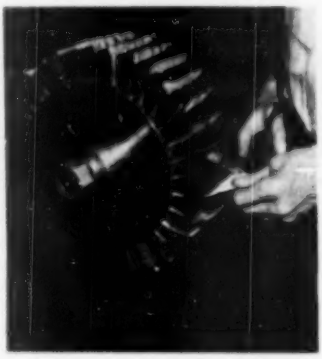

Figure 3. A Vonnegut brush-backed sander head showing abrasive coating loading which has been described as having unusual ability to follow curves in polishing. (Courtesy Carborundum Co.)

procedure, the following conditions should be used: (1) bright nickel should be used with attention given to addition agent control to avoid excess; (2) the 33 oz./gal. chromic acid bath at 110°F. should be used; (3) to avoid passivity troubles a cold water rinse totaling not more than 2 min. should be used, and contact time in the chromium bath should not exceed 15 seconds before the current is applied.

A conclusion of practical importance to the chromium plater based on work by Hoedowich[1] was that both the scratch hardness and abrasion hardness of any chromium deposit can be accurately estimated from its appearance, regardless of the temperature and current density under which it was deposited.

Bright deposits are hardest, while matte deposits are softest; frosty and burnt deposits are harder than bright deposits by the scratch hardness method but softer by the abrasion test method. Snavely and Faust[1] presented data on changes which take place in annealing of chromium plate. Ogburn and Brenner[1] conducted studies at the National Bureau of Standards using a radioactive isotope of chromium which showed that chromium is deposited directly from the hexavalent state and not from the trivalent chromium in the bath.

Chemical Coatings

Douty and Spruance[1] presented data on a new type of amorphous phosphate coating for aluminum surfaces which possesses corrosion resistance, when used alone, and also serves as a valuable base for organic coatings. The process used to produce the new amorphous phosphate coating, known as the "Alodine" coating, uses a solution consisting essentially of a mixture of chromic acid, phosphoric acid, and hydrofluoric acid, in certain well defined proportions. Shown in Figure 2 are variations in salt spray corrosion resistance with various amorphous phosphate coating thicknesses on several aluminum alloys.

The process as used in production line operations consists of the following steps:

1. Remove surface contaminants by essentially conventional means.
2. Rinse free of any adhering alkali.
3. Treat for a short time in the "Alodine" solution.
4. For maximum corrosion resistance, the treated panel is dried at elevated temperature without rinsing. If the metal is not to be painted, the process may be considered complete at this point.
5. If the panel is to be painted, the work from step 3 or 4 above, is rinsed with clean water.
6. The work is given a final rinse in dilute chromic or phosphoric acids, or a mixture of both.
7. The work is dried.

Polishing and Buffing

In several articles[1] it was stated that quality tests can be made on buff materials without the use of expensive equipment. From time to time, a check should be made to determine the moisture content of buffs, particularly if they are bought by the pound. To carry out this test, the buff should be weighed upon arrival, stored at elevated temperature, and weighed again. A rapid orientation regarding the care that was taken in manufacturing a buff can be had by taking it apart, examining all layers carefully. Usually an inspection like this will give an answer to premature wheel failure.

The latest methods in belt polishing were demonstrated before the Buffalo Branch, American Electroplaters' Society by the Carborundum Company at their regular November 1949 meet-

ing. Some of the advantages to be gained through the Vonnegut brush-backed sander head, shown in Figure 3, were also demonstrated, wherein it was pointed out that this machine is designed especially for finishing irregular surfaces, and that it has the ability to adapt itself to the contour or irregular surfaces of the work by means of its shredded abrasive tips, which are pressed into every groove and depression on the metal surface.

Organic Finishes

Dudley[15] pointed out some of the outstanding features of finishes obtained by combination of urea and melamine resins with alkyds. Properties of such finishes of interest to the production man are rapid cure and hardness of finish. Such finishes also have a high degree of mar resistance, and proper formulations show good color and color retention. It is possible to obtain hard, mar resistant finishes, which, also, have good flexibility, toughness and adhesion. Data presented at a Symposium on Alkyd Resins[16] presented before the 113th meeting of the American Chemical Society indicated the distinctive position of the alkyd resins in the metal product coating field. One of the points brought out in this connection is that, all other factors being equal, the oils used in preparing alkyd resins are important, and may be the deciding components so far as properties of the final finish is concerned. Severe tests have proved that alkyds enamels exhibit good resistance to water, chemicals, and gasoline. Many forms of commercially available alkyd resin finishes have proved themselves to be outstanding in metal product finishing applications.

(*) DeLong "Electroplating on Magnesium and its Alloys," a paper presented at the 36th Annual Conv. Am. Electroplaters' Soc.

(*) Keller and Zelley, "Plating on Aluminum Alloys," A paper presented before the 36th Annual Conv. of the Am. Electroplaters' Soc.

(*) Meyer and Brown "Cleaning, Acid treatment and Chemical Brightening of Aluminum. A paper presented before the 36th Annual Conv. of the American Electroplaters' Soc.

(*) Keller and Zelley, "Conditioning Aluminum Alloys for Electroplating": A paper presented at the 96th meeting of the American Electrochemical Soc.

(*) Helman, "Deposition of Metals on Aluminum by Immersion from Solutions Containing Fluorides": A paper presented at the 96th meeting of the Electrochemical Society.

(*) Hortis, Kompt, Yonko. ASTM Bulletin (1949).

(*) Overcash, "Acid Dips for Zinc Base Metals". Part of a round table Discussion at 3rd educational session 39th Conv. of the Am. Electroplaters' Society.

(*) Blerwata. Minerals and Methods (May 1948).

(*) Hull and Winters: "Some Factors That Influence the Operating Characteristics of Chromium Plating Baths". A paper presented at the 36th Annual Conv. of the Am. Electroplaters' Soc.

(*) Hoadwelch. "The Scratch Hardness and Abrasion Hardness of Electrodeposited Chromium Plate". A paper presented at the 36th Annual Conv. of the Am. Electroplaters' Soc.

(*) Snavely and Faust. "Studies on the Structure of Hard Chromium Plate". A paper presented at the 96th meeting of the Electrochemical Soc.

(*) Ogburn and Brenner. "Experiments in Chromium Electrodeposition with Radioactive Chromium". A paper presented at the 96th meeting of the Electrochemical Soc.

(*) Douty and Sprowson. "Amorphous Phosphate Coatings for protection of Aluminum Alloys and for Paint Adhesion". A paper presented before the 36th Annual Conv. of the Am. Electroplaters' Soc.

(*) Plating. (October 1949).

(*) Dudley, Chemical Industries (Feb. 1949).

(*) For complete report see Ind. Eng. Chem., P. 716 (Apr. 1949).

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Theodore F. Onkey, president of The McAleer Mfg. Co. Ltd. of Canada announces the purchase of a three story building with railroad siding at New Toronto, Ontario. The building comprises 12,000 sq. ft. with additional smaller buildings for storage.

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Appointment of Joseph B. Dietz as manager of the industrial sales section of the Finishes Division of the Du Pont Company, has been announced. He succeeds Henry E. Lackey, who is retiring after a career of nearly 43 years.

Mr. Dietz has been assistant industrial sales manager since 1945. A native of York, Pa., and a graduate in chemical engineering of Lehigh University, he joined the Du Pont Company at the Philadelphia paint plant and laboratory in 1924.

DETREX ELECTS R. L. MURRAY

Stockholders of Detrex Corporation, Detroit 32, Michigan, have elected Robert Lindley Murray as a director of the corporation. Detrex manufactures and markets industrial cleaning equipment, drycleaning machinery, oil extraction plants, and cleaning compounds and solvents. The company has field representatives, offices and warehouses in principal cities of the United States, and owns process and equipment patents in 17 foreign countries.

FEDERATED NAMES MANAGER OF PLATING DEPARTMENT

The appointment of Sherman M. Goble as manager of its new Plating and Electrochemical Department has been made by Federated Metals Division, American Smelting and Refining Company. A. M. Callis, general sales manager, made the announcement.

Federated's activities in the plating industry were expanded recently with the acquisition of the anode facilities formerly owned by the Metallurgical Products Company of Philadelphia. Increased production of copper, tin, lead and zinc anodes has resulted. The new department, under Mr. Goble, has been organized to facilitate sales and service.

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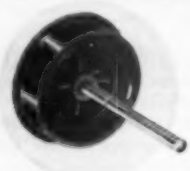
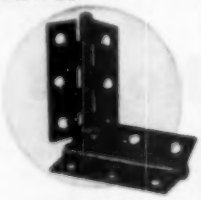


ZINC



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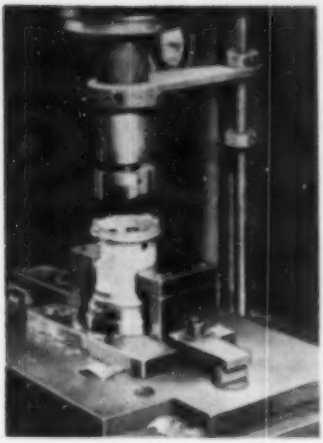


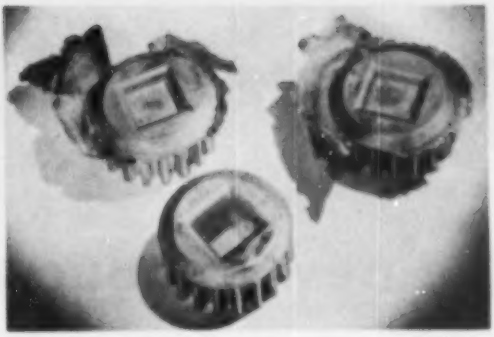


Figure 2. Before and after views of die cast gears trimmed with oil-hydraulic press. In many cases, little or no finishing is needed.

Figure 1. Die cast motor housings for electrical appliances are trimmed of internal flash in this operation. (All photos courtesy The Denison Engineering Co.)

Trimming flash with oil-hydraulic presses

W. C. DENISON, JR., PRESIDENT
The Denison Engineering Co.
Columbus, Ohio

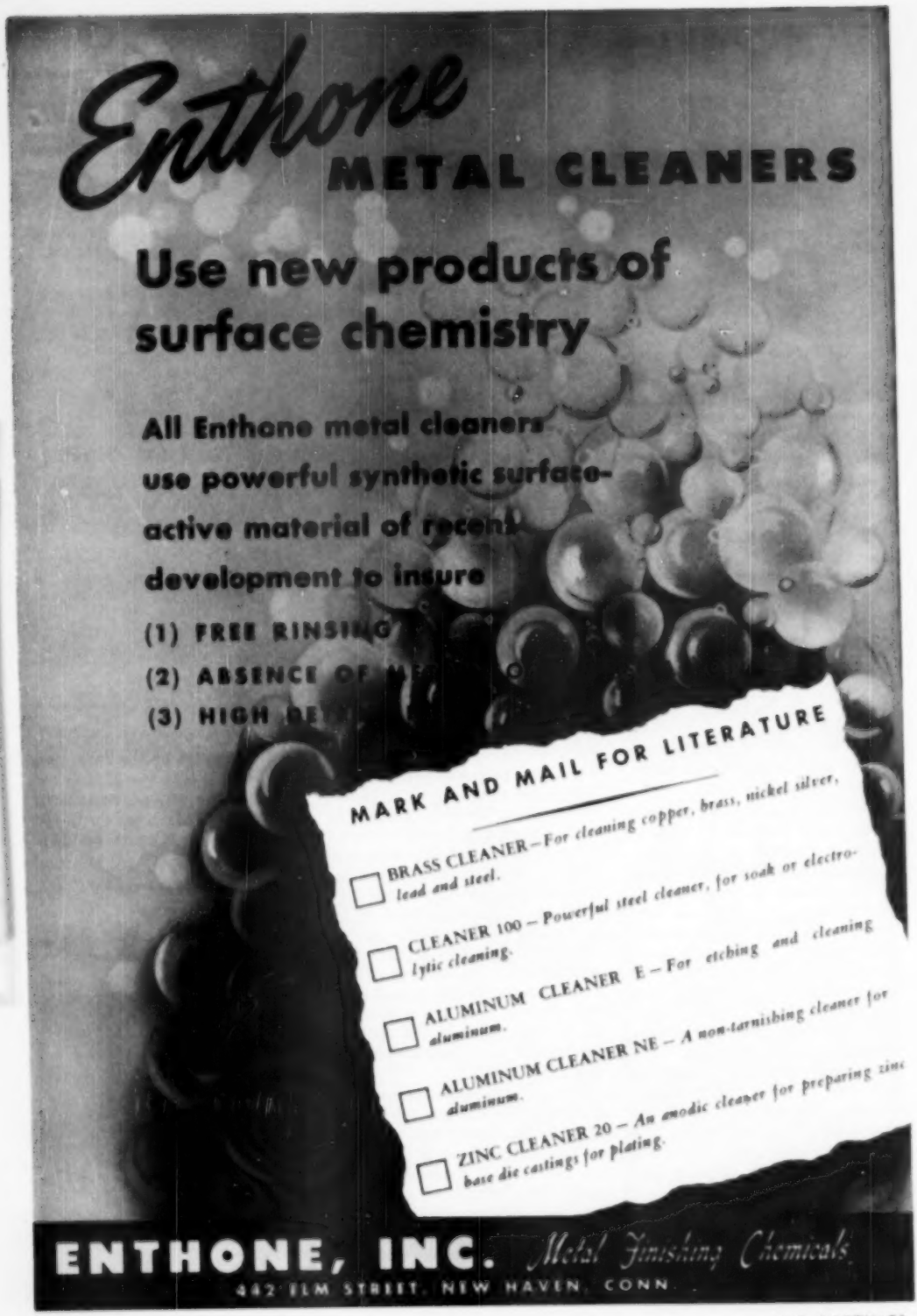
RAPID expansion of the die casting industry is reflected in a recent report by the Bureau of Census indicating an increase of 75 percent in shipments of die castings for 1948 as compared with 1946. To keep pace with demands for die cast parts, adoption of faster, better, low-cost methods of processing castings has become vitally important. One of the final operations, trimming gate and flash from these parts, is being done more and more by oil-hydraulic presses. Excess metal is removed from the castings by this method smoothly, safely, swiftly, and economically with a single cutting action.

Die cast motor housings for electrical appliances are being trimmed by one manufacturer, using this type of press. This is done with cutting dies in the shape of the part, mounted on the press ram and work table. When the dies are brought together under smooth, preset hydraulic pressure, rough edges of the casting are readily removed with one downstroke of the ram. Two main advantages said to suit this machine to the purpose are: (1) working stroke of the ram can be quickly adjusted to accommodate die fixtures of various sizes, and (2) preset control protects both the press and the tooling even if the cutting die encounters unusually heavy metal removal.

Another manufacturer is trimming flash from die cast gears in one-third less time on an oil-hydraulic press than on the mechanical press formerly used. Also, hydraulic action of the ram delivers smooth pressure so that die life is lengthened and scrap losses reduced. Since an even, exact "push" instead of a hard, hammer-like blow is exerted by the ram upon contact with the work, it is reported that expensive cutting dies often can be used up to 100 per cent longer, before resharpening is necessary.

(Continued on Page 59)

Figure 3. A single stroke of the cutting die trims flash from these die cast gears.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Useful Literature

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

No. 28—Die Sinking Cutters:

A series of die sinking cutters designed for both high and low speed has been added to the Reltool line of metal cutting tools. The new 176 page Reltool catalog includes these new tools along with descriptions and illustrations of the entire line.

No. 29—Tank Heating & Cooling Methods:

Tank heating and cooling methods are described and illustrated in a new six-page bulletin released by Kold-Hold Manufacturing Co., Lansing, Mich. A direct comparison is made between the company's Platecoil heat exchange methods and the conventional pipe coils.

No. 30—Cleaning & Conditioning Non-Ferrous Metals Before Painting:

Use of the Duridizing proprietary process for cleaning and conditioning non-ferrous metals prior to painting is discussed in a folder from American Chemical Paint Co. This process is also useful for cleaning and phosphate coating steel surfaces.

No. 31—Seven-Inch Bench Shaper:

Bulletin No. 500 from South Bend Lathe Works describes their new seven-inch bench shaper. All details and specifications are given.

No. 32—How to Apply Wrinkle Finishes:

An eight-page publication from New Wrinkle, Inc., tells what wrinkle paints are and how to apply them. Title of this compact information bulletin is, "Making Money with New Wrinkles in Finishing."

No. 33—Safety Shutoff Valve for Industrial Furnaces:

Protection of industrial furnaces against dangerous accumulations of gaseous or liquid fuels in the event of power failure is the subject of Bulletin 21 from North American Manufacturing Co. This literature describes the company's new Associated Factory Mutual Approved valve known as the Series "21" Safety Shutoff Valve.

No. 34—Reverberatory Tilting Furnaces for Non-Ferrous Metals:

A four-page catalog has been released by the Bellevue Industrial Furnace Co., Detroit, describing Sklenar reverberatory tilting furnaces for the melting of non-ferrous metals. Capacities range from 500 to 5000 pounds.

No. 35—Designing Brass & Bronze Die Castings:

Technical data useful for designing die castings in brass or bronze die castings is contained in an 8-page booklet available from Pressco Casting & Mfg. Co., Chesterton, Ind. This publication contains tabulated information on size limitations, tolerances, and physical properties of copper-base die casting alloys, as well as suggestions for good design practice.

No. 36—Facilities for Building Die Casting Dies:

A folder from Hoffman Tool & Die Co., Pottstown, Pa., illustrates the company's facilities for building die casting dies and plastic molds, and also shows zinc, aluminum and brass die castings produced from their dies.

No. 37—Fastening to Die Castings with Self-Tapping Screws:

Savings of up to 50 percent are claimed for self-tapping screws described in a folder available from Parker-Kalon Corp.

No. 38—Improving Die Finish with Diamond Compounds:

The techniques for applying Hyprez diamond compounds are described in a new folder issued by Hyprez Division, Engis Equipment Co., Chicago. These compounds are useful for obtaining high quality finish and smooth contours on die casting dies or plastic molds.

No. 39—Cleaning Die Castings Prior to Plating:

A new degreaser for die cast alloys and other metals is announced by Du-Lite Company. This degreaser is the Du-Lite Cleaner No. 72 which is especially suited for degreasing metals prior to plating. It is claimed that this cleaner does not etch or otherwise harm soft metals.

No. 40—Details of Certified Zinc Alloy Plan:

A bulletin describing the Certified Zinc Alloy Plan is available from the American Die Casting Institute, Inc., New York. By this plan, a certification seal is used to identify zinc base die castings which conform to ASTM specifications for chemical composition. The bulletin describes the plan, methods of sampling, and other details.

No. 41—Cutting Costs of Preparing Metal for Painting:

A folder from Oakite Products, Inc., tells how their new CrysCoat process for preparing metal surfaces for painting "cuts cost 10 ways." This process is useful for cleaning and conditioning metal prior to painting.

CIRCLE NUMBERS ON THE CARD AND MAIL

No. 42—Finishes for Aluminum:

A comprehensive book on various types of finishes which are suitable for aluminum is available from Aluminum Company of America, Pittsburgh, Pa. Titled, "Finishes for Alcoa Aluminum," this book covers plated, painted, chemical and mechanical finishes.

No. 43—Specifications & Tests for Plated Coatings:

The International Nickel Company, Inc., has made available a booklet containing the ASTM and AES "Specifications and Tests for Electrodeposited Metallic Coatings."

No. 44—Continuous Circular Chrome Plater:

A circular type machine is introduced in literature released by Lasalco, Inc., Chicago. Output claimed for this new machine is 4278 pieces per hour at 16 second plating. Unloading is automatic and the machine requires no racks or rack maintenance.

No. 45—Paint Primers:

Paint primers are discussed in a folder from The Industrial Finishes Dept., Atlas Powder Co., Stamford, Conn. Properties of various primers, plus recommendations, are included.

No. 46—Emulsion Cleaner Has High Penetrating Power:

Emulsion Cleaner 75 which has the high penetrating power of aliphatic hydrocarbons is presented in a new bulletin from Enthone, Inc. As a presoak, this cleaner is reported to reach pocketed oil, grease and persistent dirt. It disperses in water and is not contaminated by oil, grease or pigmented buffing compounds.

FOR DIE CASTINGS THE BUY-WORD IS

DYKAST

Why pretreat die castings – particularly zinc and aluminum—if they're *already* clean?

DYKAST is the new word now going around. Without pretreatment – on most clean die castings – Dykast Lacquer Enamels *air-dry* . . . in five to ten minutes. They provide a tough, durable coating, that is also flexible . . . available in a wide variety of colors.

With Dykast Lacquer Enamels, you cut costs – by saving valuable production time. Usually you cut out one complete labor operation!

It will cost you nothing – it may pay you greatly – to get the full details. Write for Technical Data Bulletin #113 and Standard Color Card. Better yet – let an M & W Sales Engineer discuss your requirements with you.

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M&WCo 1876

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PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

NEW Products

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

MELTING POTS FEATURE INCREASED SERVICE LIFE

The Meech Foundry, Inc., has announced the availability of a new series of Meechite melting pots developed especially for handling non-ferrous metals. The new pots have been designed to meet the requirements of aluminum foundries, die casting plants, smelting works, and battery plants, and are furnished in almost any size and shape (round or rectangular) with capacities ranging from 50 to more than 10,000 pounds.

Meechite melting pots are cast from a durable, close-grained chromium alloy iron, with minimum porosity. These pots are reported

to reduce the number of "melts" lost because of iron pick-up.

Furnished for use in melting, holding, and pouring operations, the new pots feature gradual tapering wall thickness and side angles of slope to resist swelling and distortion and to provide increased working life.

The five Meechite pots shown in the accompanying photograph are the types most generally in use. Types "M," "ME," and "S" are melting pots, type "H" is a holding pot, and type "T" is a melting and pouring pot. For additional information circle No. 1 on the attached card.

CIRCLE NUMBERS ON THE CARD AND MAIL!

CONTROLLED ATMOSPHERE FURNACE HAS HIGH PRODUCTION CAPACITY

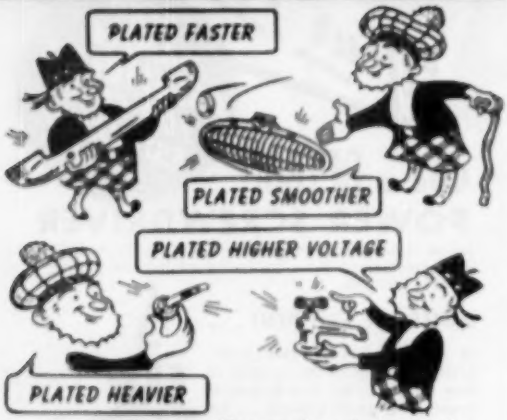
To meet the demands of heat treaters for a versatile furnace which would offer high production capacity with a minimum of capital investment, Surface Combustion Corporation has developed a new batch-type radiant tube fired unit. This modern furnace is designed for clean hardening, gas carburizing, dry cyaniding and other controlled atmosphere heat treatments.

Many heat treaters have expressed their desire for a controlled atmosphere furnace which would be somewhere near the cost of a standard furnace and yet embody the high production characteristics of a specialized unit. These heat treaters also wanted a unit which would have much greater flexibility than that normally found in a high production special furnace.

After extensive engineering development and field test work, Surface Combustion Corporation announces its new high production batch-type furnace for all types of control atmosphere heat treatment of steel.

TELL US
Your Problems
SEND SAMPLE ASSEMBLIES FOR FREE ESTIMATES NOW!
Use a DETROIT
POWER SCREWDRIVER
Discard the out-of-date, slow hand method of driving screws . . . Do it this speedy, time and labor saving way that will boost your production and bring costs down.
IMMEDIATE SHIPMENT . . .
on certain models. Detroit Power Screwdrivers are hopper-fed and furnished in three models . . . Will drive all types of screws, as fast as one a second . . . All driven to uniform tension . . . Will not strip threads or mar heads.
Model A
A sensitive but sturdy machine for driving small screws in delicate assemblies. Capacity, No. 2 to No. 6 screws. Both bench and pedestal types. Designed for maximum service, easy operation and speed.
Model C
A powerful machine for heavy-duty assembly work. Every part husky enough to stand driving hardened cap screws to a tension of 10 foot pounds. Capacity, ¼" to ⅜" diameter screws.
Model B
A real production machine designed for constant service. It drives a range of screws of all types from No. 6 to ¼" diameter, up to 2" in length. Both bench and pedestal types.
Write for Catalog
SEND SAMPLE ASSEMBLIES FOR ESTIMATE
DETROIT POWER SCREWDRIVER CO.
2823 WEST FORT ST. DETROIT 16, MICHIGAN

. . . The Evidence from a Rapidly Growing List of W•C•M Brite Copper Users



A production run will prove that a fast, smooth bright copper plate may be produced at a minimum cost.

From the List of W•C•M After Dip Brite Zinc Users

A bright, corrosion resistant finish for zinc plated parts at a lower make-up and maintenance cost.

Write for descriptive circular on W•C•M Products

Distributors
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BART MESSING CO
44 Meeker Ave
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Bristol, Connecticut
ARMALITE CO LTD
118 Richmond Ave
Toronto, Canada

WIRE COATING & MANUFACTURING CO.

395 EAST 131st ST. • CLEVELAND 8, OHIO

Work is carried in and out of the furnace on four trays which are moved by alloy screws. A lowerator quench mechanism is included which provides "semi-automatic" operation for the charging and discharging of the furnace.

Fast heating rates developed by the use of radiant tube firing, combined with a fan to circulate heated, prepared atmosphere, provide production up to 200 pound per hour gross loads per square foot of area. The furnace has a maximum gross charge capacity up to 2500 pounds, depending upon the type of work to be processed.

Floor space requirements of this furnace are low in view of its production capacity. With the RX atmosphere generator built integrally into the furnace unit, a 16 ft. long by 9 ft. wide space is adequate for the entire furnace.

For additional information circle No. 2 on the attached card.

IMMERSION HEATERS SUITED TO SOLVENT CLEANERS

A new portable tank immersion heater for heating solvent cleaners, oil and water solutions, tar and other compounds has been announced by the Edwin L. Wiegand Company, manufacturers of Chromalox electric heating units.

The heated section can be had with either two or three hairpin elements. Two-element heaters are designed for a uniform dissipation of heat over the length of the tank. Three-element heaters afford a high concentration of heat in confined areas. For additional information circle No. 3 on the attached card.

ADHESIVE FOR RIGID MATERIALS DOES NOT SHRINK OR SWELL

A new thermosetting resin compound, Armstrong's Adhesive A-1, is announced by its manufacturer, Armstrong Products Company, Burket, Indiana.

This adhesive joins metals, glass, ceramics, plastics, wood and numerous other rigid materials to themselves and to each other.

Armstrong's Adhesive A-1, it is reported, is unique in that the resin mixture contains no volatile solvent and does not shrink or swell

(Continued on Page 64)

LET US PROVE TO YOU HOW YOUR FINISHING COSTS CAN BE REDUCED WITH MURCO TUMBLING BARRELS
SAMPLE PARTS PROCESSED
At no charge or obligation. Write today for complete details.

MURCO Tumbling Barrels are preferred today by plants that deburr, burnish, clean, polish, and smooth-surface metal and plastic parts on a mass-production basis. With its variable speeds, you have a wide range to meet various operating conditions and requirements . . . the special brake mechanism stops the barrel in any position, as well as facilitates loading and unloading . . . prevents accidental dumping of loads.

D. J. MURRAY MANUFACTURING CO. *WAUSAU, WIS.*

BALANCED PRODUCTION

(Continued from Page 22)

sist of an inner and an outer casting. The outer casting forms a shell which is finished in hammer-type baked enamel, as is the remainder of the scale. This shell slides over the beams and permits adjustment.

The inner castings supply the weight, and conform closely to the interior contour of the outer shell. The two parts are held together by machine screws.

One other casting is the open end trip loop post which is die cast complete with graduated markings, and is ready for assembly after being painted. The markings are recessed, and white paint is wiped in to make them clearly legible.

Summary

The Ohaus Scale Corporation has found that die castings are inherently accurate and uniform, that they are adapted to the production of large quantities of accurate instruments, and that therefore, accurate weighing devices have been made available to greater numbers of people at lower cost.

From a production point of view, the uniformity of the die cast parts makes them fit drill jigs and fixtures for rapid machining, which is not true of sand cast iron or brass.

TAXI METER PARTS

(Continued from Page 27)

gear train, clockwork motor and several shafts.

The rear plate, for example, is formed with more than 30 through holes cored into it, and the front plate is similarly cored.

The exterior surface of the front plate has four round holes cored in the corners, two of which are formed with countersinks, as shown in Figure 2. The inside of the face plate has four hollow bosses at the corners, two of which have shouldered extensions to mate with the countersunk holes in the front plate. This assures precise alignment of the two die castings.

The result of this great care in fitting the framework together is that all components fall into place with a minimum of hand fitting or juggling. As indicated in Figure 2, four counters for mileage are assembled onto the front surface of the front plate by being aligned against a die cast rib and end pad. A single set screw clamps the four counters firmly in position so that they mate with the apertures in the face plate—all locations being assured by the accurate mating of the four corner bosses and cored holes.

This uniformity from part to part, and from one batch of castings to the next, has made die castings widely accepted for the construction of all sorts of business and vending machines.

Characteristic of zinc die

Here are more

ACCURATE Die Castings

ROLL FILM ADAPTER FOR SPEED GRAPHIC CAMERA

THIS device permits roll film to be used with a speed graphic camera instead of the customary cut film. The castings, in addition to being very thin, have to be perfectly light tight around the edges. Each component part must fit perfectly. Practically no machining was necessary on this high precision job.

This was no unusual assignment for us. Rather it was typical of the type of work which is continually being turned out in our plant. We welcome inquiries on our facilities.

ACCURATE DIE CASTING Company

3089 EAST 80TH ST. CLEVELAND 4, OHIO

castings is the ease with which they can be finished. The three die castings which make up the exterior of the Electro-Meter have a combination of finishes which illustrates this.

Bright and Satin Chrome

The face plate, mentioned above for the accuracy of its dimensions, serves as the front of the housing, Figure 3. This part, along with the die cast flag, is given a combination of bright and satin chrome plate.

All recessed portions are sand blasted with fine abrasive to obtain a satin surface; then the raised portions are polished and buffed to a lustre.

Chrome plating develops a surface identical with that of the basis metal on which it is deposited, and thus retains the combination of satin and bright produced by sand blasting and buffing. This offers a striking combination of reflecting and non-reflecting surfaces.

The rear case of the housing is finished with an organic coating. It is first cleaned, then sprayed with a coating of hammer-tone synthetic enamel and baked. This hammer-tone finish makes it unnecessary to polish the rear casting prior to finishing.

All interior die cast surfaces are finished with Enthone Ebonol Z for uniform appearance and corrosion protection.

Power Transmission Elements

Among the smaller die castings used for functioning parts, one of the most interesting is the pillow block for a worn gear which is driven by flexible shaft directly from the motor transmission.

The pillow block, Figure 4, contains two oilless bronze bushings cast as inserts. The bushings are held on two movable cores which lie in the die parting plane.

Since the inner bushing is not readily accessible once the unit has been assembled, provision for supplying oil to the bearing has been made by introducing an oil wick through a hollow boss at the rear of the pillow block. This opening is cored by a fixed core in the cover half of the die, which must fit so snugly against the bronze insert that the bronze is exposed to the oil wick.

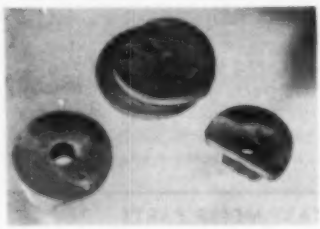

Figure 5. Many small functioning parts and power transmission elements are die cast at lower cost.

The pillow block die casting requires no machining; the bushed holes for the worm gear shaft can be used without reaming. The pillow block may be mounted in either of two positions on the back of the rear

LARGE OR SMALL
SIMPLE OR COMPLEX

"ZAMAK" ZINC ALLOY CASTINGS ARE OUR SPECIALTY

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- UNION DIE CASTING CO. offers 24 years of specialized experience in plumbing goods, oil, gas and butane equipment and builders' hardware.
- We have the most modern equipment for machining, plating and assembly. Whatever the job, we can do it *quickly, correctly* and at the *right price*.

Wherever you are located, whatever your die casting need, we would like to submit quotation.

UNION DIE CASTING CO., Ltd.

2313 East 51st St. Los Angeles 11, Cal.

MEMBER OF AMERICAN DIE CASTING INSTITUTE

plate, depending upon whether the meter is to be mounted in the glove box or outside.

Also shown in Figure 4, along with the pillow block, are three other die cast parts of the power transmission system—a pair of ratchets and a detent wheel. These parts, simple in shape, are less expensive as die castings than by any other fabricating method because they are complete and ready for use after trimming off the flash and performing one or two drilling or tapping operations.

One of these pieces is a 20-tooth ratchet with accurate tooth formation, a hollow shank and a cored hole. The drilling of a tiny taper pin hole and the drilling and tapping of a set screw hole are the only operations on this.

Three cams illustrated in Figure 5 perform special synchronizing functions. Each of these would be more expensive to produce by other methods. Most complex is the heart cam, consisting of a heart-shaped piece and a circular piece connected by a hollow shaft. This is die cast in one piece to accurate dimensions and requires no further machining.

A number of other small parts are represented in Figure 6, giving some idea of the diversity of size, shape and function of small die cast working parts.

Die castings have helped in the production of this taxi meter in many ways besides cost: they helped get into production faster, they helped to reduce the parts inventory by combining pieces into unitary construction, they helped obtain an attractive exterior, and they guarantee long life by their dimensional stability and ruggedness.

FROM WOOD TO DIE CASTING

(Continued from Page 10)

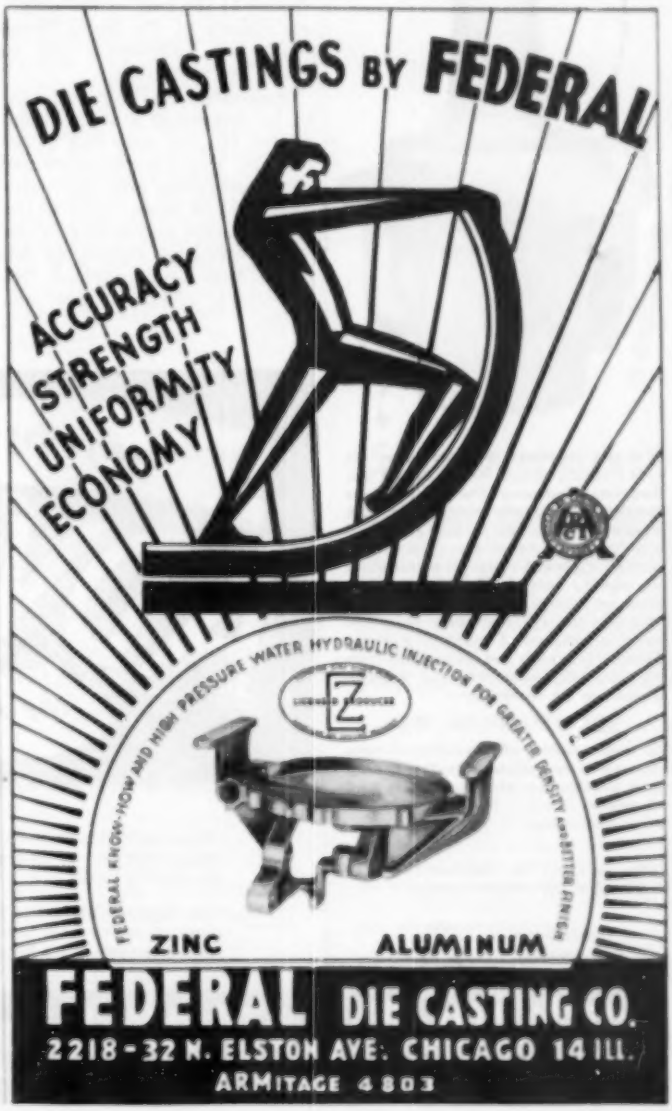
vantages gained by die casting.

For example, location of the switch which is actuated by pressing a button in the top, is very critical. Parallel relationship of the switch and the top surface regulates the proper action. The switch is mounted on a stamped shelf which is, in turn, located accurately against small horizontal ribs formed inside the die cast housing halves. It has been possible by locating against these unmachined ribs, to hold the position of the switch parallel within ±.005 tolerance.

An unusual use of Speed Nuts for assembling this shelf can be observed in Figure 6. A small screw extends upward through the stamped shelf near the outer edge. A Speed Nut slipped over the screw clamps down over the die cast locating rib to furnish a secure assembly.

The loud speaker is assembled into the unit by making use of die cast bosses. Two small, round, pointed bosses serve to locate the speaker approximately. A pair of thread cutting screws attach the speaker and give positive location.

The two halves of the station are located and assembled by



means of four small pins driven into holes jig drilled into the corners. One end of the pins is knurled to anchor it into the casting, but the other end is not knurled so that the two halves can be separated for servicing.

Two Phillips head screws hold the two halves together. These screws extend in through drilled holes in the rear half and are engaged by a pair of Speed Nuts which are clipped over a horizontal bar attached to the rear of the speaker, Figure 6. By using Speed Nuts here, allowance can be made for variations.

Resonance has been eliminated by cementing a strip of saturated felt into each half of the station. This absorbs unwanted sound vibration and eliminates distortion of tones. Due to the specific shape and section of the larger executive station, no felt strips have been required. No disturbing vibrations are produced.

The proof of the pudding, according to the old saying, is in the eating; therefore, the results of redesign will speak for themselves. An increase of al-

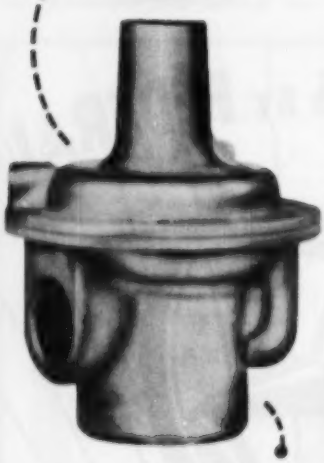
Figure 6. Two identical die castings form the housing of the staff station.

most 75 percent in the sale of metal-housed staff stations has been reported, as compared with previous sales of the wooden units. First customer reactions were tested with the smaller, less expensive staff stations, and the immediate response was favorable. Similar reaction is being noted for the executive stations which have been placed on the market more recently.

These instruments have been

LD

IT'S A FACT!



The gas regulator illustrated was die cast from aluminum for the Detroit Gas Regulator Company. The specifications required a pressure regulator for gas appliances that must be leak proof and accurately control pressure to the burner. Litemetal's precision aluminum die casting solved this problem. Very little machining was needed and the overall cost was extremely low. Just another example of meeting a manufacturer's problem and reducing his costs through fine, lightweight and durable, aluminum die casting by—

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an organization of specialists — men thoroughly experienced in the casting and machining of magnesium and aluminum alloys — the new metals of structural design.

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Advanced methods, *advanced* service and *advanced* equipment add up to complete satisfaction on your die casting needs.

Our expanded facilities put us in an excellent position to serve you economically and promptly. Inquiries invited on long or short run jobs.

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thoroughly tested, inside and out, and can be expected to have exceptionally long service life. Talk-switches were tested for a quarter of a million operations in preliminary tests, and all parts are designed for heavy duty. The die cast housing in a zinc alloy will withstand severe impact, and the finish is one which can hold up against corrosion from the atmosphere or abrasion.

PRECISION EXPANDS

(Continued from Page 15)

The Reed Metal Crafts organization, headed by Roe F. Reed, will remain intact. Address of the plant is 3532 N. Knox Ave., Chicago 41.

With regard to the British affiliation, the company states, "In spite of difficult economic and labor conditions existing in Britain, they have proven themselves most resourceful in new developments which can be extremely useful in this country.

By the same token, officials of the Wolverhampton Company feel that developments of the Precision Castings Company in the field of large and intricate die castings will be very helpful in improving the British economy."

100,000 NEW JOBS

(Continued from Page 18)

of the employment outlook for engineers, recently completed by the Bureau of Labor Statistics of the U. S. Department of Labor. The report, one of the Bureau's Occupational Outlook series, issued for use in vocational counseling of veterans and students, will be published next fall.

PEACE CANNOT BE KEPT BY FORCE, ASME HEAD WARNS

Warning that "history is full of the failures of nations to keep the peace by force," James M. Todd, retiring president of The American Society of Mechanical Engineers, urged this country not to plan a peace time program built primarily on military strength. In an address, he asked American engineers to give "the rest of the world the necessary inspiration to struggle toward a higher level of civilization."

Mr. Todd, a consulting engineer of New Orleans, delivered the "Presidential Address" at the annual banquet of the ASME during its 70th annual meeting in New York. Referring to the theme of the five-day gathering of 6000 engineers from this country and Canada, "Engineering in a Peaceful World," Mr. Todd said, "We must show the subjected races of the world—through our engineering contributions, hope of a peaceful world; a wider knowledge and understanding of the ambitions and deeds of American engineers who have helped civilization's material progress."

In lieu of a military line of defense by the use of our most recent developments in engineering, he said, we must encourage thinking in terms of the peace economy possible; we must use the same facilities to give the

NE

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DIE CASTING

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in Assurance of Quality - Economy Service by New England's most modern plant and equipment, under the personal supervision of

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designer and consultant for 25 years

INQUIRIES INVITED

PRODUCTION UPPED 15%!

DIE LIFE DOUBLED!

(Scrap minimized!)

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MOULDLUBRIC 306

Mouldlubric 306 is made specifically for cold chamber die casting; it is silvery in color, which means easier cleaning. It is diluted with mineral spirits and sprayed on the heated mould.

Results in the case of one automotive parts maker: 15% greater production . . . die life doubled . . . scrap cut from 4 to less than 1% . . . Cleaning easy, using Houghto-Clean 230, our emulsion-type cleaner.

For gravity-flow dies we supply Die Casting Lubricant 85, Hi-Temp Oils, too, for lubricating ways. For details and prices, write

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TOUGH DIE CASTING JOBS ARE OUR MEAT . . .

We like to figure on tough die casting jobs. *Fort Die Casting* engineers have cracked many a tough nut and we are ready and willing to take on your problem.

In addition to a competent engineering staff who can adapt your designs to take full advantage of the speed, economy and quality of the die casting process, we have fully equipped tool and die rooms to convert these ideas into reality.

Call on us today.

"Certified Analysis Alloys"

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world the benefits of engineering for peace-time development.

"The reported atomic developments in Russia make it even more imperative that engineering developments be utilized for peace and not for destruction," he warned. "As the Soviet Red Star so aptly put it, 'there are just as many kilometers from Philadelphia to Moscow as from Moscow to Philadelphia.' If another conflict should develop—we may no longer be able to confine the devastation to foreign soil."

Calling the United Nations the "World's Safety Valve," a description he attributed to General George C. Marshall, Mr. Todd said:

"If through this 'valve' we learn to blow the damaging accumulations of pressure—without armed conflict—then the effort, the sacrifices toward that accomplishment will not have been in vain."

FROM BLUEPRINT TO FINISHED PART

YOUR BEST SOURCE FOR DIE CASTINGS IS

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- Comprehensive engineering and design service
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TRIMMING FLASH

(Continued from Page 47)

Dimensional variations that occur occasionally in die cast parts are said to present no trimming problem. The ram applies preset pressure when the cutting dies touch the work surface, regardless of part dimensional variations. That is, if the part happens to be slightly oversized or undersized, the ram automatically conforms to the height of the casting instead of continuing through an unvarying, fixed stroke cycle.

Figure 4. Hydraulically-driven dies remove flash from these castings.

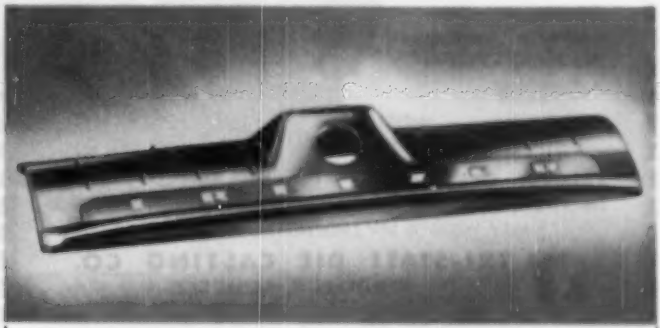
Simplicity of the oil-hydraulic press facilitates operation so that, in most cases, the time required for job training is reported as negligible. Only relatively light pressure on the dual control levers is needed to correctly apply preset force to the work. This, plus the fact that the press operator can remain seated, holds fatigue to a basic minimum. Many plants have women operators exclusively for these presses.

A large manufacturer of home washing and ironing machines has one of the most modern production setups for finishing aluminum die castings. At one point in this arrangement, an oil-hydraulic press stationed alongside a conveyor is used to trim flash from the die castings. Accepted castings arrive in pans at the machine, and with one stroke of the press ram, both right and left castings are trimmed. Connecting gates are also cut off by the trimming dies in this single ram action.

PLATING WASTE DISPOSAL

The "Disposal of Plating Room Wastes" is the subject of a research project being sponsored by the American Electroplaters' Society. The object of this project is to evaluate known methods for treatment of plating room wastes and to attempt to develop new methods of treatment. The two factors being given greatest consideration are the efficiency of the treatment and its cost.

The information thus obtained will enable engineers to design equipment for specific installations and to keep the cost of the equipment at a minimum.



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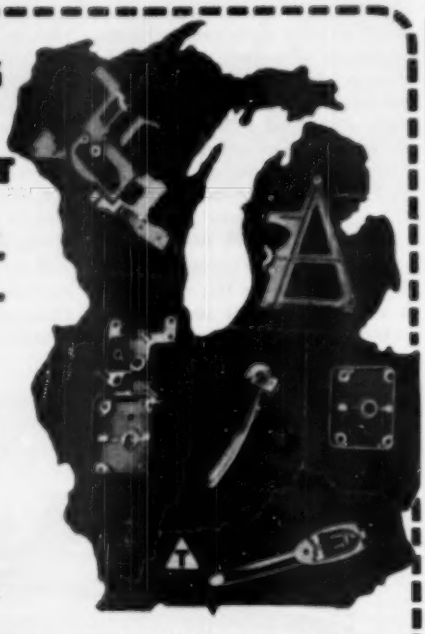

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INDUSTRY NEWS

PARKER WHITE METAL OPENS ARKANSAS PLANT

The Parker White Metal Company of Erie, Pennsylvania, has announced creation of the Southwest Die Casting Company to operate a plant for fabrication and finishing of metals from Arkansas aluminum at Jacksonville, Arkansas, in the former maintenance area of the wartime Arkansas Ordinance Works.

The new plant will devote initial production to aluminum handles, automotive parts, automotive grills, chromium trim and electrical equipment in 30,000 square feet of floor space and with an initial investment of $50,000.

It will be under the direction of A. E. Backus, vice-president of Parker White Metal Company.

NOW! TINY ZINC DIE CASTINGS FAST—AT LOW COST!

GRC's new automatic mass production facilities offer important economies and quick service on really *small* die castings of sturdy zinc alloy. Quantities from 100,000 parts to many millions. "Smallness" unlimited!

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ALCOA CHIEF RECEIVES CHEMISTRY AWARD

H. V. Churchill, chief of the analytical chemistry division of ALCOA Research Laboratories in New Kensington, has been selected to receive the 1949 Pittsburgh Award by the Pittsburgh section of the American Chemical Society.

The presentation of the award, which was given in recognition of Mr. Churchill's distinguished service to chemistry in Pittsburgh, was made at a dinner meeting at the University Club on December 14.

During his 30 years of service with ALCOA, Mr. Churchill has made many outstanding contributions to the progress of the aluminum industry. His study and research of the standardization of analytical chemical methods and application of the spectrograph to aluminum problems have been most outstanding.

Inventions and improvement of new products by Mr. Churchill include: modification of sili-

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con alloys, ham boilers, inhibited shaving cream, fruit acid aluminum cleaner, removal of fluorine from water with activated alumina, water softening and numerous others.

Mr. Churchill has also written many articles for technical and trade papers, and has made contributions to at least two well-known books in the aluminum industry.

CARPENTER STEEL NAMES REGIONAL SALES HEAD

The Carpenter Steel Company announces the appointment of Omar V. Greene as New England sales manager with headquarters in Hartford, Connecticut. Mr. Greene succeeds Wynn F. Rossiter, who has been made assistant to the vice-president to devote his time to special work.

John W. Thompson, formerly manager of alloy steel sales, has been named manager of sales development to succeed Mr. Greene in this capacity at the company's main office in Reading, Pa.

DOW METALLURGIST SPEAKS AT CONFERENCE

J. C. H. Stearns, manager of ingot sales, Magnesium Division, The Dow Chemical Company, presented a talk, "Recent Developments in Nodular Iron," before the New York State Regional Foundry Conference in cooperation with the College of Applied Science of Syracuse University at Syracuse.

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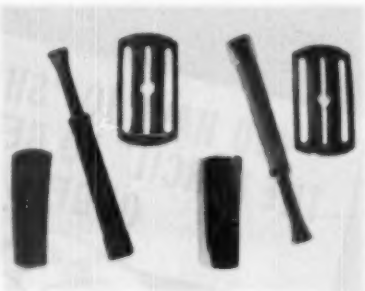

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STAMFORD, CONNECTICUT

IMPROVED METHOD

(Continued from Page 57)

center post has been die cast from the start because it would be difficult to form by any other process. A small, pointed boss, formed inside the hub, rides on the ball bearing, providing single-point suspension and minimizing friction.

Wire-Formed Dish Rack

The wire-formed dish rack which was originally part of the Cameron dishwasher has been superseded by a die casting which is less expensive to produce, more rigid in service and more attractive in appearance. (See front cover illustration.)

The wire-formed dish rack consisted of a circle with 19 vertical dish supports welded into place. The dish supports, plus the cross bracing, required 23 separate welding operations.

Now the dish rack is die cast in a single piece, with all upright posts integrally formed. This is an extremely difficult die casting to produce, and yet is being supplied in production quantities. The posts are more rigid than was possible by formed wire, fabricating operations have been completely eliminated, and a more durable piece is the result.

NEWTON NEW HAVEN

DIE CASTINGS
IN ZINC AND ALUMINUM

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NEW BRANCH COORDINATOR ASSIGNED TO MIDLAND

Announcement has been made of the appointment of W. R. Caple as coordinator of branch office activities for the magnesium sales department of The Dow Chemical Company. In his new capacity, Mr. Caple, who has been in charge of magnesium sales in the Chicago office, will work out of Midland, Michigan.

GETS METALLURGY POST

Clifford A. Hampel has been named supervisor of extraction metallurgy at Armour Research Foundation of Illinois Institute of Technology. Hampel formerly headed the inorganic technology program of the ceramics and minerals department.

Mr. Hampel, a chemical engineer, will supervise the Foundation's extensive research program on the recovery of metals from their ores.

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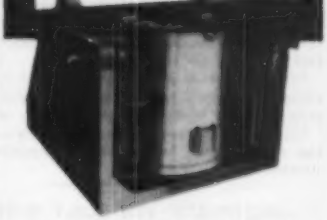

Maximum strength and durability with rapid and efficient melting practice are features combined in the designing and building of 'Surface' Stationary and Tilting Types Metal Melting Furnaces. Equipped with either high or low pressure 'Surface' Automatic Proportioning Burners which utilize any common gaseous fuel.

The selection table below depicts the wide range of applications.

SELECTION TABLE

	TYPE	Max. Temp.	Series	Recommended for Melting	Bulletin No.
TILTING	Crucible	2300°F.	TCB	Brass and Copper	TC-45
		1400°F.	TCA	Aluminum	TC-45
	Pot	1400°F.	TP	Aluminum and Magnesium	TP-45
STATIONARY	Crucible	2300°F.	CB	Brass and Copper	CB-45
		1400°F.	AC	Aluminum	AC-45
	Pot	1400°F.	AM	Aluminum	AM-45
		1300°F.	SM	Salt Metals	A-M-45
		1600°F.	SA SAV	Salt Metals	SV-49

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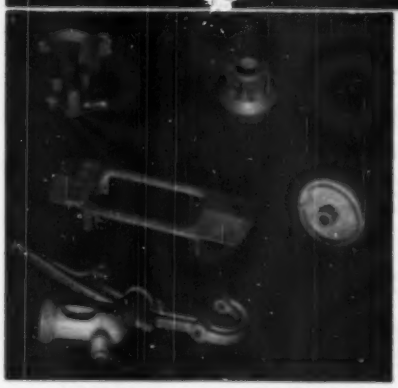

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NEW PRODUCTS

(Continued from Page 52)

upon hardening. The entire composition, it is stated, sets up to a rigid solid and becomes the adhesive bond between the materials to which it is applied.

No primer coating or open assembly drying is required, it is stated. For additional information circle No. 4 on the attached card.

PLASTIC-SURFACED TRACING PAPER AND CLOTH

Tecnifax Corporation, Holyoke, Mass., manufacturers of diazotype reproduction materials for Ozalid and similar whiteprint machines, is offering new plastic-surfaced intermediate papers and cloths known as Tecnilith and Tecnicloth, in both sepia-line and black-line formulations. This is the first time black-line diazotype intermediates have been offered to the industry.

Tecnilith prints of either color, printed in reverse from the original tracing, are claimed to produce better blue or black-line prints than those produced from the original tracing, at equally fast speeds.

Tecnicloth has a base material of a finely woven tracing cloth of a high transparency. For additional information circle No. 5 on the attached card.

MACHINISTS' VISE BUILT WITHOUT T-SLOT AND BOLT HOLES

The Parma Manufacturing Company, Parma, Michigan, announces the new, improved Low-Boy machinists' vise which is being offered in two sizes.

The unit is built without T-slots and bolt holes, thus the inside of the vise is kept free of chips and dirt. The manufacturer claims this feature saves swiveling and clamping time. Extra clearance between table and cutting tool are provided. A new lock plate for the swivel permits a locking area of 360°, clamps the vise rigidly with less pressure and saves time required to work T bolts around in chip-filled slots.

For additional information circle No. 6 on the attached card.

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POURING

MELTING

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MEECHITE melting, holding, and pouring pots have been developed for use in ALUMINUM FOUNDRIES, DIE CASTING PLANTS, SMELTING WORKS, and BATTERY PLANTS. They are available in a wide variety of sizes with capacities ranging from 30 to 10,000 pounds.

MEECHITE pots feature longer service life and maximum resistance to swelling and distortion. Minimum iron pick-up assures higher quality castings.

Price and delivery quotations on all types of pots can be furnished by return mail.

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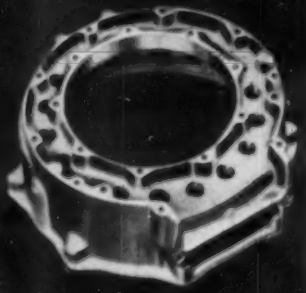

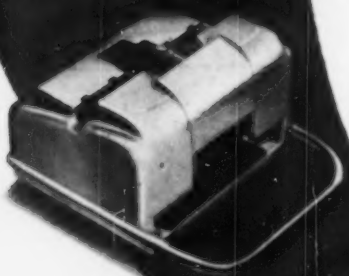

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